Corfajia Rogoh. 1831.

TRAVELS,

COMPRISING

OBSERVATIONS MADE DURING A RESIDENCE

IN

THE TARENTAISE,

AND VARIOUS PARTS OF THE

GRECIAN AND PENNINE ALPS,

AND IN

SWITZERLAND AND AUVERGNE,

IN THE YEARS

1820, 1821, AND 1822.

ILLUSTRATED BY COLOURED ENGRAVINGS AND NUMEROUS WOOD CUTS,

FROM ORIGINAL DRAWINGS AND SECTIONS.

BY R. BAKEWELL, ESQ.

Ignotis errare locis, ignota videre
Flumina gaudebat, studio minuente laborem. OVID.

IN TWO VOLUMES.

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Page 50. line 13. from the top, dele *after their death.*
—— 92. line 2. from the bottom, for *nummus* read *nummos.*
—— 305. line 5. from the bottom, for *tibia* read *tibiæ.*
—— 381. line 2. from the bottom, dele the inverted commas.

CHAPTER I.

THE AIGUILLE DE DRU. — UPPER END OF THE VALLEY OF CHAMOUNY. — THE COL DE BALME. — SECONDARY STRATA, GEOLOGICAL INFERENCES FROM THEIR POSITION. — ANNUAL APPEARANCE OF RED SNOW ON THE ALPS. — DIMINUTION OF ALPINE SNOW BY EVAPORATION. — INHABITANTS OF CHAMOUNY.

THE most striking object in the valley of Chamouny, next to the glaciers, and far better worth the labour of the journey to see than Mont Blanc, is the *Aiguille de Dru*, a taper spire of granite, which shoots up to the height of eleven thousand feet above the level of the sea, and is apparently detached from all the surrounding mountains. The upper part, or spire, rises nearly to a point, in one solid shaft, more than four thousand feet: it is utterly inac-

cessible; its sides are rounded, and are said to have a polish or glazing like that which is sometimes seen on granite rocks exposed to the action of the sea, but this I could not discern with my telescope. It appeared composed of perpendicular plates of granite. By what means it has been shaped into its present form is difficult to conceive. When approaching the Glacier de Bois, it is impossible to view without astonishment this isolated pinnacle of granite, shooting up into the sky to such an amazing height. I have neither seen nor have I heard of any pinnacle of granite in the Alps that can be compared with it, for the elegance of its form, or for the length of its shaft. The *Geant*, it is true, is nearly equal to Mont Blanc in height, but it does not rise so far above its base as the Aiguille de Dru, and when seen at a distance, its form is like a bended finger.

In approaching the Glacier de Bois from the inn at Chamouny, after passing through a wood of pines and larches, the glacier is seen descending from the *Mer de Glace* into the valley, and over it, in the back ground, rises the Aiguille de Dru, behind which is the Aiguille Vert. The latter nearly rivals

Mont Blanc in height, and presents a very striking escarpement of bare rock towards Chamouny, while its back, which is rounded, is covered with snow. When seen from Geneva, this mountain appears perfectly pyramidal. A sketch that I took of these mountains, in approaching the source of the Arveiron, will give a better idea of the outline of this impressive scene, than an elaborate decription. See Plate IV.

The upper part of the Glacier de Bois is several thousand feet above the valley, and after a warm day in August, avalanches from it are very frequent. In the course of one hour, we saw four considerable avalanches, and heard several from the other side of the glacier. The masses of ice may be observed in motion for a little time before they detach themselves, and when they fall upon the rocks below, the noise resembles the distant discharge of heavy artillery, followed by a succession of echoes. When the ice was once in motion, it would fall in a continued stream for a considerable time, which, seen at a distance, resembled a cataract: with the ice were intermixed large blocks of stone, which had long lain upon the glacier. I counted

several seconds between the first motion of the ice and the time when it struck against the rocks, and some seconds more before the sound reached the ear. I could have waited for hours to observe these avalanches, but as the sun declined they were less frequent, and ceased before evening.

Though the summit of Mont Blanc is seen from Chamouny, the appearance of this mountain is rather disappointing; its height seems lost in its enormous bulk. To have a distinct view of Mont Blanc, as a whole, it is necessary to ascend some of the neighbouring mountains. The *Col de Balme*, at the eastern end of the valley, presents a full view of the valley of Chamouny, and the range of mountains on each side of it, comprising Mont Blanc, with the Aiguilles and glaciers. The Col de Balme is the direct passage into the Vallais, and a cross, which marks the boundary of Savoy, is placed upon it. We engaged mules and guides to make the ascent, and were fortunate in the weather, for the day was clear without being hot. The most pleasing, and I think the most magnificent, part of the valley lies between the priory of

Chamouny and the village of Argentière. It is no longer under the dreary and solemn shade of Mont Blanc, but numerous majestic pyramids diversify the scene; the valley becomes narrow, and is richly ornamented with trees, and the river Arve, rushing between finely-clothed rocks and precipices, enlivens and beautifies this part of the route. Beyond the *Glacier de Bois*, there are two other considerable glaciers; the first, that of *Argentière*, has a large cavern at the bottom; the other is called the *Glacier de Tour*. The little village of Argentière, with its church and glittering spire, and the two lofty Aiguilles above it, form a most pleasing and sublimely picturesque scene. The cheerful appearance of cultivation, with a village and village-church, is always gratifying amidst lofty precipices and snow-capped mountains.

We took our char as far as Argentière, to lessen the fatigue of the journey; here we left it till our return, and mounted the mules. Whilst this was arranging, we saw some of the inhabitants returning home to the village; among others, we remarked one woman of extraordinary beauty and elegance of form, she was carrying a bundle

of faggots on her head. I recollected the interesting account given by Saussure of his conversation with a woman of Argentière, into whose house he entered to request some milk, March 1764, and I was willing to believe that the handsome paysanne was one of her descendants. "An epidemic dysentery (says Saussure) had prevailed in the village some months before, which carried off, in a few days, the woman's father, and her husband, and her brothers, so that she was left alone with three infants in the cradle. Her figure was noble and commanding, and her physiognomy bore the impression of calm but profound grief, which rendered her appearance interesting. After giving me some milk, she enquired whence I came, and what was my business among them at that season of the year. When she understood that I was a Genevese, she said that she could never be made to believe that all protestants would be damned; there were many worthy people among them, and God was too good and too just to condemn them all indiscriminately." Then, after a moment of reflection, she shook her head, and added, "But it is truly strange, that of all

who have departed from this world, not one has ever returned. I (she continued, with a strong expression of grief) who have so deeply lamented my husband and my brothers, who have never ceased to think of them, who implore them most ardently every night to tell me where they are, and what is their present state: Ah! surely if they were any where in existence, they would not leave me in this uncertainty. But perhaps (added she) I am not worthy of this favour—perhaps the pure and innocent souls of these infants (looking at the cradle) enjoy their presence, and an happiness which has been refused to myself." "This singular mixture of reason and superstition, expressed with force in the energetic language of the country, the situation, the solitude, the delirium of a mind carried away by grief, made an impression which will never be effaced from my remembrance." *Voyages dans les Alpes*, tom. ii.

Leaving Argentière, the river Arve, which continues to flow below the road, pours over a considerable precipice, and forms a fine cascade; soon afterwards it diminishes to a small stream, having lost the waters of a rivulet called la Buisine. The

valley became bare of trees as we advanced, and was entirely denuded before we arrived at the village of Tours, which is about two miles above Argentière. The pasturage is good here, but owing to its elevated and exposed situation, the harvest is very late. The last of the cultivated fields contained barley, oats, flax, and potatoes; the crops were at that time (August 28th) in about the same state of maturity as in the Peak of Derbyshire at the same season of the year. In another part of Savoy, we had seen the barley harvest nearly over two months earlier, on June 26th.

The houses of the village of Tours are built near to each other: our guide informed us, that in the winter they were often entirely buried under the snow for several weeks, and the inhabitants cut passages through it, to form a communication from one house to the other. The ascent from Tours to the summit of the Col de Balme is in some parts rough and difficult: the first steep, for there are two, brought us to an elevated plain, which extends to the foot of the second steep, that forms the summit of the Col. From the first there is a very fine view of the valley of Chamouny and Mont Blanc, and many of the

sketches of this mountain that have been published were taken from this station. A little beyond it, there is a large chalet, where milk or whey may be procured.

The sky was transparent, and clear from clouds over our heads, but in the north it was overcast, and clouds were driving towards Mont Blanc, which threatened to hide it entirely from our view, but I observed that, when they came within a certain distance of the mountain, they remained motionless, and dissolved as rapidly as they advanced. It was remarkable, that though volumes of clouds were moving directly towards Mont Blanc all the day, the mountain remained brilliantly illumined by the sun till the evening. It seemed as though the clouds were repelled by the north wind striking against the mountain and reverberating from it; but it is more probable that a current of warm air from the south-west, met the one from the north, and dissipated them before they could reach the southern range of mountains in the valley of Chamouny.

Having ascended the summit of the Col de Balme, we saw on the eastern side below us the upper valley of the Rhone, and the

mountains which border it, as far as St. Gothard; but the outline was not well defined, owing to a slight degree of haziness in the eastern horizon, though the atmosphere was uncommonly transparent on the western side of the Col de Balme. We descended a little below the summit to be screened from the wind, while we took our dinners on the grass; there was a mass of snow immediately beneath us, though the mountain is below the estimated line of perpetual snow. The height of this mountain-pass is stated at 7676 English feet above the level of the sea; this, however, is not the true height of the pass, but that of a hill above it, which commands a more extended view of the Vallais, and was measured trigonometrically by M. Pictet. The summit of the passage of the Col de Balme cannot be much more than 3000 feet above the valley of Chamouny, though it is about 4700 feet above the upper valley of the Rhone, at Martigny, and about 6400 feet above the level of the sea.* The descent towards Martigny is very steep.

* The valley of Chamouny is 3400 feet above the level of the sea, and that of the Upper Rhone, at Martigny, is only 1700 feet.

Looking to the west, Mont Blanc is seen in profile, from its summit to its base, and its different parts rise above each other in their just proportions. The summits of the principal Aiguilles, those of *Charmos*, the *Aiguille Vert*, the *Aiguille de Dru*, *d'Argentière*, and *de Tour* are seen nearer, and in the same range. These peaks rise from eleven to thirteen thousand feet above the level of the sea, and would in any other position be regarded with astonishment, but the effect of their amazing height is diminished by the superior elevation and magnitude of Mont Blanc. On the north side of the valley are seen a lower range of mountains, which, from their red colour, are called the Aiguilles Rouges; beyond these is Mont Breven, and nearer, on the north-west, rise the mountains of the Valorsine. The valley of Chamouny appears deep and narrow, and is seen from one end to the other, with the Arve winding along it. The Col de Balme on which we stood closes the eastern end of the valley, and a mountain called the *Vaudange* closes the western extremity. The length of the valley is about fifteen miles: when viewed from hence, there can be little doubt of its

having once formed a lake, before the waters of the Arve escaped, as at present, through a lateral chasm to Pont Pelissier. The occurrence of valleys closed in at both ends is not unfrequent in Savoy. I have before remarked that such valleys could not have been formed by submarine currents, or by rivers running through them; this is evident from their present structure.

The base of the mountain of the Col de Balme is granitic, but the north and north-west side of the mountain are composed of nearly vertical beds of sandstone, puddingstone, micaceous sandstone, nearly resembling mica-slate, dark soft schist, schisty grey limestone, and slate. The sandstone, puddingstone, and micaceous sandstone alternate; they range nearly north-east by north. Standing on the summit of the Col de Balme, one of these beds, of vast thickness, is seen plunging down into the valley to the north-west, and is nearly vertical and uncovered by any other bed, to the depth of fifteen hundred or two thousand feet. Were any decomposition, or erosion of the lower part to take place, the whole bed must fall into the valley. I could

not approach sufficiently near to ascertain its nature, but I believe it to be the schisty limestone described by Saussure. I did not see the beds of puddingstone which are associated with the vertical beds of this mountain, as *in situ* it would have required another day to examine the north side of the Col de Balme, towards the Valorsine. The beds of which I obtained specimens, are greyish or reddish schist, with rather a fine paste, and containing particles of mica, and would, in the Wernerian nomenclature, be denominated a grey-wacke schist. In the paste are imbedded numerous bolders and fragments of gneiss, mica-slate, and quartz, varying in size from that of a pea, or smaller, to seven or eight inches in diameter; some are perfectly rounded, others are angular, and some have a rhomboidal form, derived from the cleavage of the rocks, from whence they were originally broken. Many of these beds are absolutely vertical, others have a slight inclination; they alternate with sandstone, and thin beds of schist, in which are few or no fragments. The total thickness of the beds of schist and puddingstone is about 620 feet, and they may

be traced along their basset edges to the distance of a league, where they are covered by earth. They are succeeded by sandstone and slate. That these beds of puddingstone contain the true fragments of other rocks, cannot be doubted; had they been all of quartz, we might perhaps have supposed them cotemporaneous with the bed in which they occur; but it would be contrary to all probability to believe that rounded pebbles, and bolders of gneiss and mica slate, together with angular fragments of other rocks, were originally formed in a bed of soft schist, and whilst it was in a vertical position. Indeed, such a mode of formation appears impossible; we have therefore a satisfactory proof, that these beds have been raised from an horizontal position, or nearly so, to their present vertical one; and as all the other beds in the same mountain, even the lower slate and granitic rocks, have the same range and position, we are compelled to admit, that they have all been elevated at the same time, and by the same cause. The mountains on the opposite side of the valley, present also the same vertical beds, and Saussure observes, that it would be absurd

to deny, that they owe their elevation to a similar cause.

The range of the beds in the whole chain of Alps in Savoy and the Haut Vallais, is generally conformable to that of the beds in the Col de Balme and the Valorsine; I therefore think we should not extend the inference too far, were we to admit that the vertical, or highly-inclined beds, in the whole of this range, owe their elevation to the same cause, whose operation is so manifest in the position of the strata of the Col de Balme. It is true we find nothing analogous to such a cause in present operation, except the very extended, but less intense agency of earthquakes. We have however only to conceive a similar force to that which shook the mountains, the earth, and the sea, over one-third of the surface of the globe, in 1754 and 1755, to be more concentrated in its action; and we cannot doubt but that it would be adequate to break a portion of the crust of our planet, and elevate its beds to the height of the loftiest mountains in the Alps.

Perhaps the numerous thermal springs existing at the feet of the Pennine and Grecian Alps, may, as I have elsewhere

said, indicate the cause by which the strata have been raised; for the connection which earthquakes have with subterranean heat can scarcely be doubted, though we are profoundly ignorant respecting the mode of its operation. It is worthy of remark, that in the vicinity of these vertical beds of puddingstone, and sandstone, fragments have been found of a rock bearing a striking resemblance to, if not perfectly identical with rocks acknowledged to be volcanic. These fragments were discovered by Saussure above the Valorsine; the stone is a whitish grey, earthy, felspar porphyry, containing a few crystals of felspar, and small brilliant specks of mica, exactly resembling, in all its characters, the rock now called *trachyte*, of which several of the volcanic mountains in Auvergne are principally composed. I do not think, however, that any important inference can be drawn from the mere resemblance between these rocks, taken as an insulated fact, such resemblances being in themselves insufficient to serve as geological characters, but when associated with several other facts, all tending to confirm the same thing, they are not to be entirely disregarded. One important

fact may be deduced from these elevated beds of puddingstone, sandstone, and other strata, ranging conformably with beds of granite and gneiss; namely, that the granite did not acquire its highly-inclined or vertical position, till after the formation of secondary strata, which are comparatively modern, as I believe I shall be able to shew those in the Valorsine and in the valley of Chamouny to be. This opinion is, I know, at variance with that of many geologists. Daubuisson, as if he had been present at the time, states, "that the beds of granite in the Alps were raised into their present vertical, or highly-inclined position, soon after their formation,' an opinion opposed by the position of the secondary strata, both here and in every part of the Alps that I have examined, unless we admit the granite to be also of recent formation. In England, the *lower* secondary strata appear to have been elevated by the same cause that raised the rocks on which they repose; but this elevation took place before the deposition of the *upper* strata consisting of magnesian limestone, lias, oölite, and chalk, and the intervening sandstones; for all these strata lie nearly flat over the edges of the inclined

under-strata. On the contrary, in Savoy, strata of similar formations occur nearly vertical, and frequently conformable to the range and dip of the granitic formations. These facts would prove that the causes which elevated the granite, have acted at different epochs on various parts of the globe, unless we are prepared to admit, that calcareous formations, containing similar organic remains, were not contemporaneous in different countries, a supposition not altogether void of probability.

That side of the Col de Balme which declines south-west to the village of Tour, is celebrated for the excellence of its herbage; several rare and beautiful Alpine plants also flourish there. In a ravine near Tour, a deep section is made in a bed of very dark schist, which was covered with a saline efflorence on many parts of its surface; and our guide informed us, that the chamois frequently descended to lick the salt. It is from this bed that the inhabitants procure the black earth which they sprinkle over the snow, to accelerate its solution in the spring. As the summers in this elevated situation are of short duration, it is of great importance to save time in getting their

seed into the ground, and it was probably accident which first discovered to them a fact now well known in natural philosophy, that dark surfaces are sooner heated by the sun's rays than white ones. It was proved by the experiments of Dr. Franklin, that black cloth laid upon snow, caused it to melt faster than where it was uncovered, by absorbing the sun's rays, which are in a great measure reflected from the surface of the snow. The simple process of sprinkling the surface of their fields with this black earth, makes the snow melt many days sooner than it would otherwise do; but our guide informed us, it was sometimes a tedious labour, for if any fresh snow should fall, or be drifted over the black earth, the operation must be repeated.

We saw several heaps of this black earth collected near the cottages, to be ready for the following spring. I wished to know what kind of explanation our guide would give of the action of the earth in dissolving the snow, as he had constantly seemed desirous of impressing us with the idea of his great knowledge. To my inquiry, in what manner the effect was produced, he

answered by a figure of speech very common in Savoy, which suited the purpose admirably of concealing his ignorance, under a veil of knowledge, — *Monsieur, la cause est bien claire; la terre mange la neige.* "Sir, the cause is very clear; the earth eats up the snow."

Returning to Argentière, where we had left our char, our voiturier, a youth we had brought from Annecy, was no where to be found. The people at Argentière told us that after he had taken care of his horse, he set out to follow us on foot. It was now evening, and we were obliged to return, not without some anxiety for his safety, which was considerably increased by our hearing nothing of him till near midnight, when he came back to the priory, greatly exhausted, having lost his way among the mountains, and wandered into the Canton of the Vallais.

The evening was most brilliant, and the lofty pyramids above Argentière, with the Aiguille Vert, the Aiguille de Dru, and Mont Blanc, were all splendidly illuminated, whilst the lower part of the valley was in deep shade. The trees in this part of the valley are principally firs and larches; there

are walnut-trees, oaks, and chesnut-trees, lower down in the valley. We saw the effect of sun-set on Mont Blanc, but it was not so striking as when observed at the distance of sixty miles from the mountain. I supped with an English gentleman, Sir James S., who passed us on the summit of the Col de Balme: he had crossed the Col de Ferret the preceding day from Cormayeur, on the Italian side of the Alps: he said he had for many years travelled among the Alps, and had crossed them in almost every direction, and was accustomed to climbing; but he had been in the greatest danger, owing to the conduct of the guide, who, instead of taking him over the most frequented pass, led him by a shorter, but much steeper ascent, which was a soft slate rock. They had ascended so high that it was more dangerous to recede than to advance, when they found the rock so steep and slippery, that even his dog could scarcely keep his ground with his claws, and they were obliged to climb on their hands and knees, and even then with difficulty could avoid gliding backwards, and falling from an immense height into the valley of Ferret. A priest who was with

them, was so much overcome by fright, that when he arrived at the summit, he lay for some minutes speechless, with his face on the ground, and when he recovered, he declared that not all the gold in the world would tempt him to ascend a second time. I mention this circumstance, as it may be useful to travellers to know, that there are two paths over the Col de Ferret, one of which is not safe.

I propose to confine any farther observations on the geology of Chamouny, principally to the secondary rocks. Saussure, after a laborious investigation of many years, has so fully and ably described the rocks of Chamouny, called primary, that he has left little for subsequent observers to add or to correct. The terms which he employed are not, however, precisely the same as those used by modern geologists, and require some explanation. The veined granite (*granit veiné*), which forms a large part of the granite of the Alps, is not (as might be supposed) gneiss, but may, I think, be properly described as an incipient passage of granite into gneiss, owing to the laminæ of mica approaching to a parallel arrangement, instead of being scattered in

every direction, as in common granite. This it is which gives it a veined appearance, when broken transversely, but the mica is not so distinctly separated from the felspar, nor so abundant as in common gneiss, though specimens may be got from it, which owing to a greater quantity of mica, might pass for gneiss. The name is however of little importance, but it is well deserving notice, that this peculiar structure appears to have influenced the form of the granite *en masse*, and to have divided it into beds, or, if the term be liked better, into strata. The direction of the strata is the same as that of the veins of mica; and when the beds, or strata, of granite are vertical, the veins are vertical also. Were it not for this circumstance, it would be impossible to say that the perpendicular strata of granite were not intersections of granite by perpendicular and parallel fissures. But when these plates of granite are seen associated with vertical, or highly-inclined strata of schist and sandstone, having the same range and dip, we can no longer doubt that the sandstone, schist, and strata of granite, have all undergone the same change of position, and

have been raised together. The upper part of Mont Blanc is a different kind of granite, in which soft greenish talc supplies the place of mica. To this combination the name of protogine has been very improperly given; it would be quite sufficient to describe it as a talcous granite, to distinguish it from common granite that contains mica. Saussure, after a very extended examination of the granite of the Aiguilles of Mont Blanc, and the southern side of the valley of Chamouny, ascertained that the general range of the beds was nearly north-east, and south-west, or parallel to the direction of the valley, and they become more elevated towards the middle of the mountains, where they are quite vertical. All the mountains on the south side of Chamouny may be regarded as united, and forming one mass, from which detached pinnacles and summits rise, as from an elevated plain. The average height of this mass is 5000 feet, and from the central part, which is granite, numerous pyramids and spires of granite shoot up to twice that height above the valley.

The northern side of the valley is composed of mountains principally of granite

and mica-slate; the beds of which are not exactly parallel with the valley, but range in a more northerly direction: the central beds are vertical.

The mountain which closes the south-western end of the valley, is composed of a blueish-grey limestone and slate; the beds ranging south-west and north-east, or in the direction of the valley, and are much inclined. The Col de Balme, or mountain which closes the north-east end of the valley, has been already described: its beds are nearly vertical, their direction is rather more northerly, than the general direction of the valley. This valley may therefore be regarded as a deep trough about twelve miles in length at the bottom, having no original outlet at either end; but the waters have worked a lateral passage in a rock of soft slate, and near its junction with a very hard granite, forming a deep chasm which extends four miles or more, from near Ouches to Pont Pelissier. Before this chasm was opened, the valley of Chamouny must have been a lake, surrounded every where by steep mountains. As the height of the bottom of the valley above the level of the sea exceeds considerably 3000 English feet; it is

therefore as elevated as the summit of Scafell in Cumberland, the highest mountain in England.

The secondary rocks in Chamouny are, 1st. those of sandstone in the Col de Balme, associated with the Pudding-stone, and schist that would be denominated greywacke slate. I am inclined, however, to refer the sandstone to the coal formation. I have specimens of it, containing fine impressions of fern, exactly similar to those in our coal strata; the stone is a micaceous sandstone, abounding in mica so much as nearly to resemble mica-slate. I have seen such sandstone occasionally in our English coal fields, nor should we, I think, attribute an anterior formation to the puddingstone, with which it is associated. I particularly wish the geological reader to bear in mind, that throughout Savoy we find calcareous strata, bearing all the mineral characters of transition limestone, and even approaching to statuary marble, which strata, if any just inference can be drawn from the organic remains they contain, must be classed with our uppermost calcareous formations; and I repeat what I have elsewhere said, that if the upper strata have undergone this

change of character, we may, with much probability, conclude that a similar change has also taken place in the strata immediately below them. The anthracite of the Alps, with dark shale and micaceous beds containing vegetable impressions, I hold to belong to a formation similar to that of our great coal formations, although it is here reduced to a comparatively small thickness, and the rocks with which it is associated approach to the state of grey-wacke; but as the latter rock passes by gradation into sandstone, this can be no objection, — nor can it be more so, to see coal shale or slate-clay approaching to the quality of clay-slate. In the mountains of the Forez, there is a very extended coal formation, similar to that of Yorkshire, reposing im-immediately on granite — this I passed through the following spring. That anthracite is found extensively in the regular coal formation, we have a proof in the Welch coal fields in Brecknockshire. 2dly, The bed of dark schist, with a saline efflorence, on the lower part of the Col de Balme, if it be not a member of the coal-formation, is most probably analogous to the lias clay, or alum slate of Whitby. I

am inclined to believe, that it is the same formation as the bed of dark schist under the mountains of Servos, which contains nodules with impressions of ammonites, as at Whitby. 3dly, A darkish grey earthy limestone in thin beds. This is seen *in situ* near the bottom of the Glacier de Bois; it is a meagre water-setting lime, and bears a strong resemblance to some of our beds of blue lias, — which I believe it to be. I saw a limestone exactly similar over gypsum, in the Vallais, east of Martigny, and I have little doubt but that this limestone in Chamouny, was originally associated with the gypsum formation in the valley, though the latter has been much worn away and deranged, particularly about the middle of the valley, where Saussure observes that a portion of the primary and secondary formations, appear to have fallen down in a state of confusion. Indeed, though the secondary calcareous strata in the valley of Chamouny have most generally the same range as the beds of primary rock, they are in many places variable. Ebel, in an imaginary section of the Alps, has represented a vertical bed of primary limestone on the northern side of Mont Blanc,

which I believe is erroneous, the limestone on the northern side being assuredly more of the nature of the English lias, than of primary limestone. If the primary limestone in Ebel's section be intended to represent that of the Col de Bon Homme, it should have been placed south of the summit of Mont Blanc.

The gypsum of Chamouny and at St. Gervaise, is undoubtedly the same as that of the Tarentaise already described. The specimen I got from St. Gervaise was precisely of the same kind as that in the valley of Brida, which appeared to have passed from the state of anhydrous to common gypsum, by exposure to the atmosphere. Some of the gypsum in Chamouny is fine-grained common gypsum, and very white, like that of the *pierre blanche* at the foot of the Little St. Bernard.

It will be recollected, that on the return of Captain Ross from Baffin's-Bay, much surprise was excited by the account of the red snow (as it was called) covering some of the snow mountains near the coast in those high latitudes. It is a little remarkable that it should have escaped pub-

lic attention at the time, that the same phenomenon occurs every year in the Alps, but at a season when it is not often exposed to the view of travellers. Our guide said that its appearance was like that of minute red grains scattered on the snow; they were to be seen in March, and generally disappeared about the end of May or the beginning of June. Several persons informed me that they had seen this red snow, and on referring to Saussure, I find he has given a very full account of it, as occurring in Mont Breven, and also on the Great St. Bernard. The powder or grains penetrate two or three inches into the snow, and are of a very lively red colour: it occurs chiefly where the snow lies in a concavity, it is deepest near the centre, and very faint upon the borders, as if it had been carried down from the edges towards the lower parts, by a partial melting of the snow. On the return of Captain Ross, the residue of some of the red snow from Baffin's Bay, after the water was evaporated, was examined, and the substance was said to be oily, and the product of some vegetable. Saussure had come to the same conclusion in 1788, from a series of expe-

riments on forty grains of this powder. See *Voyages dans les Alpes*, tom. ii. p. 44. to 48. Saussure was inclined to believe, that the red powder was the pollen of some alpine plant, but it is a subject still involved in obscurity, as there is no plant known in Switzerland, which yields such a powder. He concludes with the following queries: "J'ai déjà dit que j'ai trouvé cette poudre répandue sur les neiges de différentes Alpes, et toujours avec la même couleur, et toutes les mêmes apparences; mais est-elle absolument universelle? Se trouve-t-elle sur les neiges élévés de pays et de climats très différens? sur les Cordillères, par exemple? C'est ce qu'il seroit bien intéressant de vérifier. Car enfin, quoiqu'il me paroisse bien probable que c'est une poussière d'étamines, il ne seroit point encore impossible que ce ne fut une terre séparée de la neige même, et impregnée de matières inflammables, par une combinaison immédiate de la lumière, qui brille avec tant de vivacité dans l'air pur de ces hautes régions." Perhaps it may appear as probable, that this powder is deposited by some species of fly. Mont Breven, where the red snow occurs most abun-

dantly, is on the sunny side of the valley of Chamouny. The oil extracted from it had the smell of wax.

It has been sometimes supposed, that the snow in the higher Alps must be augmenting every year, as it falls in the region where intense frost for ever reigns. Such an augmentation would indeed take place, were it not for the operation of a cause, the force and extent of which has been till lately but imperfectly understood:— this is evaporation. A series of experiments were made by my ingenious friend, J. Holdsworth, Esq., when surgeon to the Hudson's Bay company, on the evaporation of ice and snow on the coast of Labrador, and the result proved the rapidity with which the bulk was lessened by this process. It is well known, that when the pressure of the atmosphere is diminished, evaporation is greatly accelerated, and as there is a great diminution of this pressure at the altitude of the snowy region of the Alps, the constant evaporation from the surface of the snow, is sufficient to prevent any accumulation in the average of a series of years.

The experiments of Mr. Holdsworth

were made on the banks of Lake Winepie, when the thermometer was below the freezing point of Fahrenheit, and in a situation sheltered from the sun's rays. Snow enfolded in crape, lost one-fifth of its weight in twenty-six days; and a slab of compact ice from the lake, about two inches thick, and weighing twenty pounds, lost one-fifth of its weight, between the 28th of November and the 31st of March. See *Monthly Magazine, April* 1820.

Now there cannot be a doubt but that the evaporation would have been far more rapid at the elevation of 10,000 feet, and in a situation freely exposed to great currents of wind, as on the summits of the Alps: hence we may conclude that evaporation is the main agent employed by nature, to prevent the annual augmentation of snow on lofty mountains. Other causes, such as the constant ground-thaw observed by Saussure, contribute, but in a minor degree, to the same end. The thickness of the snow on the summit of Mont Blanc was estimated by Saussure at five hundred feet.

As the valley of Chamouny is the only part of Savoy which is much frequented by the English, the two inns here are more

like English inns, than those in any other part of the duchy; the charges are also very reasonable, considering the distance from whence most of the articles of consumption are brought expressly for the use of the company, indeed, they are cheaper than in most of the other parts of Savoy or in Switzerland, where the accommodations are much inferior. The inhabitants of Chamouny are somewhat spoiled by the great influx of foreigners, and have not the simplicity of manners which characterises the Savoyards in less frequented districts. They possess a most annoying kind of ubiquity, following travellers to the mountains, and descending with them into the valleys, to offer fruit and milk, or flowers, which is a most disagreeable mode of begging, as you are surrounded by a crowd, wherever you wish to contemplate in quietude the grand objects before you.

The Chamouny guides are justly celebrated for their intelligence and activity, and for their careful attention to travellers; almost all the accidents which have occurred here, have been caused by inattention to their advice, or by urging the guides to undertake excursions when the

season was not favourable. The melancholy catastrophe of 1820, in the attempt to ascend Mont Blanc, was owing to the guides being almost compelled to undertake the ascent against their judgment. As the winters commence early, and last till late in the spring, there is little employment for the men during that season; and the guides being accustomed to a wandering life in the summer, and to a certain degree of intellectual excitement, by associating with well-informed foreigners from every part of Europe, they would sink into a state of torpor, were it not for the dangerous resource of gambling, with which they are said chiefly to occupy themselves in the winter months. It would be extremely difficult to remedy the evil here; in England the substitute for gambling would be smoking and drinking, or politics; but under the paternal government of his Sardinian Majesty, great care is taken, by the prohibition of books, that the peasants shall neither read, nor think, if it be possible to prevent them. The Chamouniards, however, from their summer intercourse with the world, are less under the influence of the priests, and less superstitious than the pea-

sants in other parts of Savoy. We asked our guide whether they did not amuse themselves with dismal stories of ghosts in the winter evenings, to which he replied, as if a little piqued, "*Nous ne croyons pas aux revenans ici.*" — We don't believe in ghosts here.

The weather, which had been fine all the time we were in Chamouny, became cloudy and rainy the day of our departure. I should have wished to prolong my stay there, but the summer was far advanced, and we had already passed nearly four months in Savoy, and were anxious to return to Geneva to meet our letters. The rain fell in torrents all the following day, which prevented me from making any observations on the strata of Maghlans, as I had intended. We arrived at Geneva on the 30th of August.

M. Peschier of Geneva has published an account of some experiments on the red snow of the Alps, which I had not seen until the preceding sheet of this chapter was printed. According to his analyses, the quantity of earthy matter, peroxid of iron, and organic matter, found in it is variable; this may arise, I conceive, from the red snow having been exposed for a longer or shorter time to the action of the atmosphere. The formation of this substance still remains unexplained.

CHAP. II.

GENEVA.*

ARRIVAL AT GENEVA, ITS EXTENT AND POPULATION. — OBSERVATIONS ON THE INDEPENDENCE OF THE REPUBLIC. — ADULATORY SPEECH OF ONE OF THE SYNDICS. — GENERAL APPEARANCE OF THE CITY AND INHABITANTS. — PRACTICAL INFLUENCE OF THE WRITINGS OF ROUSSEAU ON THE GENEVESE. — COUNTRY ROUND GENEVA. — THE CLIMATE. — SEVERE SHOCK OF AN EARTHQUAKE. — CONFLAGRATION OF THE VILLAGE OF MONETI. — JUDICIOUS CHARITY OF THE GENEVESE. — VILLAGE OF THE LITTLE SACONNEX. — FINE VIEW OF THE ALPS FROM THENCE. — MADAME NECKAR.

We arrived at Geneva near the end of October, 1820, on our return from Pied-

* The observations on Geneva, contained in this and the two following chapters, were made during a residence there in the winters of 1820, 1821, and 1822; and as they could not be arranged in chronological order with the travels, I have therefore placed them after the tour in Savoy, and before the travels through part of Switzerland and in Auvergne.

mont, by the Semplon road. It was almost dark when we entered the city; for one of our horses, which had crossed the Alps with us twice, fell lame, when we were only a few miles from the end of our tour. After leaving our passport at the gate, we proceeded along a gloomy street, to *les Ballances*, the principal hotel. The next morning I sallied forth to reconnoitre the streets in the vicinity; a quarter of an hour's walk brought me to *la Place St. Antoine*, which overlooks the lake, when I was surprised to discover that I had made the circuit of more than half the city. Geneva had, from my earliest recollections, occupied a large space in my imagination, as the metropolis of Protestant Europe, placed in opposition to the mighty papal Rome; I was, therefore, rather disappointed to find that this celebrated city covered only a quarter of a square mile of the earth's surface*, or about four times the extent of Russell-square in London. I had read, perhaps twenty times, statistical accounts of Geneva; but when early notions

* *Viz.* the whole city, if reduced to a square, might be bounded by a line of half a mile in length, on each side, as I ascertained by measuring the plan of Geneva.

are once deeply fixed in the mind, they are not easily removed by subsequent information, unless we are compelled by circumstances to examine them with attention.

Geneva, as a city, possesses few objects to recommend it to the notice of those travellers who view only "the surfaces of things." The public buildings are devoid of beauty, the streets are dull, and the houses, though lofty, appear massive and heavy; they are built of sandstone, and covered with dark tiles. There has been only one new house built in the city during the last forty years; the fortifications prevent its extension on each side.

Many families live under the same roof, as at Paris, each family generally occupying one story, or what, in Edinburgh, is called a flat; but among the poorer citizens, one room often serves for a whole family. A census was taken while we were at Geneva, in 1822, and there was one instance of twenty-two families living under the same roof; several houses in the lower part of the city contained upwards of fifteen families, more or less numerous.

The streets of Geneva generally feel cold, as from the height of the houses the sun's rays rarely shine into them; and as these rays are far more powerful here in the winter months, at mid-day, than in England: when you enter the streets, on returning from the country, a sensation is felt like that of descending from a warm atmosphere into a cold vault. To this sudden change may, I think, be partly attributed the disorders in the teeth, so prevalent at Geneva; but the proximity of the city to such a large extent of fresh water, is supposed to be the principal cause of this malady. Part of the city is built on a level with the lake, and the Rhone passes through it, separating the parish of St. Gervaise from the main city. The river is crossed by four wooden bridges. The Rhone divides into two branches, which soon unite again, thus forming a small island, over which you pass in going to St. Gervaise. In this island, the earthquake, which shook Geneva while we were there, was most forcibly felt. The upper part of the city is situated about 100 feet above the lake; it is here that the cathedral of St. Pierre, and the houses of the

more opulent and ancient families are situated, the lower streets being occupied by tradesmen and artizans. This division of the city into *upper* and *lower*, is supposed to have perpetuated the strong feelings of aristocratical distinctions, which have caused so many political dissentions among the citizens. Geneva has only three gates, so that you are obliged to traverse a great part of the town to go into the country. The gates are shut at an early hour, after which a trifling toll is paid on passing through; and at eleven o'clock they are finally closed for the night, and no one can pass without a written order from the commander of the garrison. Formerly the gates were closed at an earlier hour. The readers of Rousseau's Confessions will remember in what affecting language he describes his agony of mind, when a boy, on seeing the draw-bridge raised as he was returning in haste from a truant excursion into the country. The inexorable guard refused his entrance; he slept without the walls, and being afraid to return to his master, he threw himself, a friendless fugitive, upon the world. To such a trifling event may be ascribed the

circumstances of his future life, and the influence which his writings have produced in society. Had he remained in Geneva, he would probably never have been known beyond its walls.

Though Geneva is regularly and strongly fortified, the fortifications would be of little avail in a siege, as they are commanded by heights within gun shot; they might, however, resist a *coup de main*, and prevent the town from being taken by surprise. The fortifications are now undergoing repair, though some of the inhabitants think it would greatly contribute to the prosperity of the town to demolish them: it was, however, decided otherwise by a majority of the great council,—a decision made with a true patriotic feeling, for the Genevese cannot and ought not to forget, that they owe the preservation of their independence to their walls, which saved them, once at least, from the domination of the dukes of Savoy, at the time of the escalade, in 1601.

The number of inhabitants in the city is about twenty-two thousand. Before the accession of territory, granted by the allied powers, in 1816, the population of the

whole republic scarcely exceeded thirty thousand; at present it amounts to forty-two thousand, and Geneva forms a canton of the Helvetic confederacy.

If there be few objects at Geneva to attract the attention of superficial travellers, except its situation, yet it presents many interesting subjects of inquiry to the reflecting observer. The first which suggests itself is,—by what means was this little republic enabled to preserve its independence for so long a period, surrounded as it was by powerful and hostile states? To the enmity which too generally exists between tribes or nations in immediate contact with each other, was added the fierceness of religious animosity; Geneva being held in abhorrence by all the Catholic states of Europe, from the time of the Reformation. The city is not strong by position, and the citizens were often much agitated by civil dissensions. The preservation of the political independence of Geneva, under these circumstances, can only be accounted for by the mutual jealousies of its powerful neighbours. Geneva may be compared to a bone placed before the mouths of three growling mastiffs, each

one ready to seize it, but fearing an attack from the other two.

The praise of great prudence in managing their negociations and concerns with other states cannot be withheld from the government, during many periods of extreme difficulty, and if this prudence sometimes degenerated into servile flattery of the stronger power, great allowance should be made for the spirit of the age, and the critical circumstances with which the Republic had to contend. Thus in the reign of Louis XIV. the Genevese refused to receive an accredited resident agent from William III. who was at the head of the Protestant interest in Europe, while they flattered, to the utmost of their power, the French monarch, the great enemy of the Protestant faith; but the friendship of the English king could have availed them nothing against the enmity of Louis, who might have annihilated their republic before the news could have reached England. Of their flattery to Louis XIV. on the peace of the Pyrenees, in 1660, and his marriage with the daughter of the king of Spain, Picot, in his *Histoire de Geneve*, has given us the following amus-

ing specimen, well worth preserving, as an instance of the adulatory style of the age; it is a rambling rhapsody of incoherent metaphors, which, from their extravagant absurdity, might have made the Grand Monarque forget his dignity and gravity, to indulge in a hearty laugh. Andrew Pictet was the orator sent from Geneva to Paris; and as this was a very tedious journey in those days, it gave him ample time to collect all the flowers of rhetoric for the occasion. Part of his speech, given literally, is as follows:

"Your Majesty, all powerful and in-
" vincible, having conquered yourself by
" this amorous peace, has brought off the
" prize of a victory, which surpasses the
" value of all the rest, and which crowns
" all your former triumphs; for this great
" princess, who constitutes the principal
" trophy, was the apple of the eye of the
" enemy's country, and the first blossom
" of the Spanish crown. Her virtues and
" graces surpass all my thoughts, and the
" expressions of man, and are only com-
" parable to the august splendour of the
" emperors and kings from whom she is
" descended, and to the majesty of that

"throne on which she is at present seated, "and to the perfections requisite in the "wife of a king, as much elevated above "all others, as the lily is above other "flowers; and of a monarch who has just "displayed himself to our eyes, like the "rising sun, resplendent with glory in the "midst of the stars in the firmament of "France, and amidst the acclamations of "a numberless people, who fill this great "city, or rather epitome of the world, "which already feels the marvellous effects "produced by this royal union of your "Majesty, &c. These are the wishes of "Messieurs the Genevese, who most hum-"bly supplicate your Majesty to honour "them with a continuation of the same "good-will and grace, with which they "were favoured by the kings, your prede-"cessors. They will never fail in the re-"spect they have vowed to your Majesty, "nor in their prayers to God for the pre-"servation of his sacred person, and for "that of the queen his most dear spouse, "and for a benediction on their royal bed, "and for a glorious posterity."

The waters of the Rhone are distributed into various parts of the city, by an hy-

draulic machine, which supplies the public fountains. It affords daily employment to a considerable number of men and women (chiefly Savoyards) to carry the water from these fountains to the families on the different stories of each house; and as many of the houses are six or seven stories high, this is no small labour. They chiefly carry it on their heads or backs, in wooden vessels made for the purpose. In the upper part of the city, many of the stair-cases are sufficiently broad to admit of an ass passing up with panniers on his back, and it was formerly the custom for them to ascend even to the upper stories with flour, bread, wood, &c. This custom has been discontinued for nearly fifty years.

The lower classes of citizens, at Geneva, with their wives and children, are generally neatly dressed, and the labourers have their clothes well mended, and appear clean and comfortable. Beggars, or persons in rags, are rarely seen in the streets, unless it be a few stragglers from Savoy. The very respectable appearance of the female servants, speaks strongly in favour of the morality of the higher classes.

The condition of the poor is, perhaps,

not sufficiently taken into consideration, by travellers, when choosing a residence on the Continent. In many of the towns you are constantly assailed by a swarm of beggars, whenever you descend into the streets, and thus your feelings are harassed by the sight of extreme misery, which, perhaps, it is not in your power to relieve. It is true, the daily and constant occurrence of such shocking exhibitions of wretchedness renders us less sensible to the impression; but tranquillity may be too dearly purchased, if accompanied by habitual insensibility.

The Genevese are a mixed race, derived from the French, the Germans, and the Italians. By long intermarriages, they have acquired a peculiar characteristic physiognomy. The children are handsome, but they appear to lose much of their beauty as they become adult. Soon after our arrival at Geneva, we had an opportunity of seeing a large portion of the male population of all classes pass in procession to attend the funeral of a respected citizen, and were impressed with the striking difference of form and stature, that seemed to mark two distinct races; the one tall and well

made, the other remarkably dwarfish, and more or less deformed. The latter were generally among the aged. We frequently observed the same difference afterwards; indeed, I scarcely ever saw so large a portion of dwarfish and deformed old men and women as at Geneva, and this is the more remarkable as the children are mostly well formed.

On enquiring into the cause of the improved appearance in the present generation, we were told that it had formerly been the general custom of the Genevese, to send their children out to be nursed among the peasants of Savoy, where, by improper treatment, and the want of due nourishment and cleanliness, they became rickety and unhealthy, and the foundation was laid for disorders of the spine. Some time after the publication of Rousseau's *Emile*, his eloquent appeal to mothers began to produce an effect on his countrywomen; the barbarous custom of sending their infants from home was abandoned, and it became the general practice for mothers either to suckle their children themselves, or to have wet-nurses in the house. Several inhabitants of Geneva, who were

far from being admirers of Rousseau, were candid enough to acknowledge, that this desirable change had been effected by his writings.

It is a well known maxim, that prophets and reformers have no honour in their own country, and history has confirmed the truth of this maxim, when limited to the life-time of the individuals; but after their death, those cities which persecuted them with the most violence while living, were the first to erect statues or temples to their memory, after their death. The honour Rousseau received from his native city, during his life time, was of a mixed kind; he was admired by a large portion of his countrymen, but he was held in abhorrence by those aristocratical families, who afterwards destroyed the liberties of their country, by calling in the aid of foreign troops, and who governed the city several years, under the protection of an army of strangers. A few years after Geneva had thus lost her liberty, she became a part of the French republic. At this period a statue was erected to Rousseau, on the spot which is now the Jardin des Plantes, and a public dinner, to honour his memory, was given

to the children of the poorer citizens once a year. They brought their plates and knives and forks with them, and partook of the repast, seated on the grass, around the statue of their supposed benefactor. When Geneva once more recovered her independence, the dinner was discontinued, and the statue was removed. The populace were by no means pleased at this, and it happened that on the evening of the day on which the statue was removed, a brilliant meteor passed over the city and exploded. This they supposed to be the spirit of Jean Jaques, glaring with fiery indignation for the dishonour done to his memory. One of the centinels on the ramparts, near whom it appeared to pass, fainted away with fear under this impression, and was found prostrate, in a state of insensibility.

From the circumstance of families occupying only one story in a house, and having no garden or outlet whatever, their domestic conveniences are much abridged; and perhaps to this cause may be chiefly ascribed the former general custom of sending out the children to nurse, and the occasional instances of it which now take

place. One morning, when Mrs. B. was taking a walk in the country, she met a woman coming from Geneva, carrying on her head something in the form of a coffin for an infant, but much deeper, and entirely covered over with green oil cloth. On the top was a large bunch of pink ribbands, and a bouquet of flowers. As the woman was near the church at Chene, Mrs. B. concluded she was carrying a dead child for interment, but on enquiry we were informed that it was a living child going out to nurse in Savoy.

Geneva is surrounded by what may be styled a level country, slightly diversified with gently sloping hills of low elevation, and richly adorned with neat country houses, cheerful villages, and groves of the horse chesnut.

The immediate scenery, so far from being Alpine, or savage, is what may properly be called *riante par excellence*. In autumn, when the light clouds descend so low as to hide entirely the distant mountains, and even the nearer Saleve, as is frequently the case, leaving the valley clear, an Englishman might suppose himself in Hertfordshire, or in some other of the rich and

tamer scenes in his own country; but should the clouds rapidly disperse, he would be astonished to see a new creation burst upon his view, where before there appeared no space left in the horizon.

The valley, or basin, in which Geneva and the lake are situated, is about seventy miles in length, and varies in breadth from fifteen to thirty miles. It is bounded on the north by the Jura, which ranges, like an enormous wall, along the horizon. On the south it is bounded by the lower calcareous range of the Alps, which, bending to the north, unite with the Jura, and close up the vale at the western extremity, where a narrow chasm is cut through the mountains, called the Passage of L'Ecluse, through which the Rhône escapes. This is about eighteen miles west of Geneva, and must have been produced, either by erosion, or a forcible disruption of the strata. Before this chasm was formed, the waters of the lake covered the whole valley, of which there remain evident proofs, but to this I shall refer in a following part of the volume.

The height of the Jura above the vale, varies from 3000 to 3500 feet; the nearest

part of the range is about twelve miles distant from Geneva. Though its outline is too straight for picturesque effect, yet its sides present many bold projections and deep indentations, which, from the varied accidents of light and shade, have frequently an imposing appearance. On the south-east of the valley, the mountains called the Great and Little Saleve, present their escarpements to it, which are nearly perpendicular, exhibiting a bare face of stratified limestone, which appears heavy and formal. These mountains obstruct the view of Mont Blanc from Geneva, but it is visible immediately after passing the northern gate, called *Porte de la Suisse*, and also by walking half a mile from the western gate, or *Porte de la Rive*. The principal mountains of the Savoy Alps, seen from above the walls of Geneva on the south, are the *Buet* and the *Aguilles d'Argentière*. Their summits are covered with eternal snow. Strangers often mistake the dome-shaped summit of the Buet for Mont Blanc; it is about fifty miles distant from Geneva, but such is the transparency of the atmosphere, and the magnitude of the object, that its stratification

on that side which is too steep to retain the snow, was distinctly perceptible from our apartments on St. Antoine, even without the aid of a telescope. Midway, between the Buet and Geneva, rises the *Mole*, its conical summit forms a conspicuous and distinguishing feature of the landscape, from almost every part of the vicinity of Geneva. This mountain is considerably below the lower line of eternal snow, but its summit generally begins to be covered with snow early in the autumn, and remains so till near the beginning of May. The snow descends or recedes on its sides, according to the temperature of the upper regions of the atmosphere, which, seen from Geneva, serves as a kind of mountain thermometer, to indicate the state of the weather in the higher Alps. It need scarcely be added, how greatly the vast expanse of the lake, heightens the beauty of the scenery, from almost every station in the vicinity of Geneva.

Perhaps no city in Europe has a greater variety of fine drives around it than Geneva; the roads are excellent, and sufficiently broad for any kind of English carriage. Another advantage is, that the view of the

country is not obstructed by high walls, as is the case in the neighbourhood of Vevay and Lausanne.

Of the climate of Geneva, I shall only speak comparatively, for we can judge little of the real state of the climate, as it affects health and comfort, from tables of the mean temperature of the atmosphere, and the annual quantity of rain that falls. At Geneva and its vicinity, the sky, in the months of November and December, is much covered with clouds, which hide the mountains, but do not, like our autumnal fogs, often descend so low as to touch the ground in the valley. These clouds seldom rise higher than about 1800 feet above the lake. On ascending to that elevation, the atmosphere is often quite clear, and the higher Alps are seen rising through the vapour, like mountainous islands in the midst of the ocean, splendidly illumined by the sun. The atmosphere of Geneva is sometimes obscured by clouds for several weeks in the winter, while Lausanne and Vevay, at the other end of the lake, are enjoying bright sunshine all the day; but the weather is often beautifully fine in the month of February, and from the middle

of April to the end of October, the climate may generally be called delightful. As Geneva is situated 1220 English feet above the level of the sea, the difference of mean temperature between this city and London is considerably less, than the difference of latitude would indicate. The summers are seldom oppressively hot, and in this respect the climate is different from that of Lyons, which is only half a degree further south. The difference of the latitude from that of London is most sensibly perceived in winter at Geneva, by the increased length of the days, and this is made still more perceptible by the clearness of the atmosphere; indeed Geneva enjoys two hours more useful day light than London, in December and January.

The number of frosty days at Geneva in winter, may, perhaps, somewhat exceed those in England, though on an average the temperature may be nearly the same; but the cold is more severely felt at Geneva, being generally accompanied by the *bise*, an easterly, or north-easterly wind, which is dry, keen, and penetrating, and when violent, often produces an inflammation of the throat and trachea, attended

with difficulty of breathing, and dread of suffocation. This disorder is called *la grippe.* The first winter I was in Geneva, the frost for a short time was very severe, and the bise most piercing; eight hundred persons were said at one period to be affected with *la grippe*, and I was myself among the number. For persons affected with pulmonary complaints, Geneva cannot be recommended as a desirable winter residence. I have before mentioned that the vicinity to the lake is supposed to produce rheumatism and disorders in the teeth; but I believe its influence does not extend far from the surface of the water. I was returning on horseback one evening after sunset from Copet, by the side of the lake: it was the latter end of April; the day had been remarkably warm; the air was clear and calm, and when the road rose forty or fifty feet above the lake, the atmosphere continued mild, and genial; but whenever the road brought me near to the level of the water, I felt a damp chilling coldness, greater than I should have supposed could possibly be produced, by such a trifling difference of elevation. On reflection, it was evident that a thin stratum

of dense cold air covered the water, but did not rise high above its surface, being kept there by its own density, and remaining undisturbed by any agitation in the atmosphere. Now as this must be of frequent occurrence, we may easily conceive that houses situated in the lower part of the city, on a level with such a stratum of air, must be in some respects unhealthy. The upper part of Geneva is, however, more than eighty feet above the lake.

The country round Geneva is seldom visited by those dreadful hail-storms, which often ravage the middle of France, in the same parallel of latitude. The upper part of the valley of the Rhône has repeatedly suffered from earthquakes, particularly in the vicinity of Brieg and Leuk. Geneva and the lower valley of the Rhône have been less frequently, and less violently affected by these awful phenomena. One of the greatest shocks that had occurred for many years, took place the second winter we were at Geneva, on February 19th, 1822, about nine o'clock in the morning. The day previously, M. André de Luc, who had been dining with me, expressed his opinion that the east wall of the house was not

secure, being raised upon an older wall, which had evidently yielded a little on one side. The first noise and sensation of the earthquake I attributed to the house giving way, but I was soon undeceived by the returning shock. The morning was calm and cloudy; I was standing in the saloon, when I heard a sudden crash, as if a door had been burst open violently, and a mighty wind seemed rushing through the passages, and every part of the house. Mrs. B., who was in bed in the adjoining room, feeling her bed move, enquired what was the matter. I went into the room and stood by the bed-side, attentively listening to the noise, which grew deeper and seemed to surround me. I then felt myself and the whole house lifted up and rocked by repeated oscillations, producing a sensation like that felt when standing in a boat, that is lifted up by a sudden swell of water. This last shock continued five or six seconds; all the bells in the house, and most of the bells in the city, were set a ringing by the motion, particularly the public fire-bell. On opening the door, I found all the family assembled in the corridor in great alarm. Except the fall

of one chimney, no damage was done in the city; but several of the neighbouring towns and villages in Savoy and France suffered considerably, particularly Chamberry and Annecy, where many chimneys were thrown down, and in the former place, the wall of a church was much injured. At a village in France near Belley on the Rhône, every house was more or less damaged, and several shocks were felt there on the two following days. By referring to the journals afterwards, it appears, that at the same time, viz. from the 18th to the 21st of February, Vesuvius was much agitated, and a new crater was opened.

The shock evidently advanced by an undulatory motion, but the arches of each undulation could not have been of any great extent, otherwise the surface of the earth must have been fractured in various parts. It should seem also, that between each undulation and the progressive one there was a line but little agitated, as some of the houses in Geneva were scarcely moved, while those on each side were smartly shaken. Clocks that stood in a direction at right angles to the line of

motion had their pendulums stopped by the shock. From Geneva, the progress of the earthquake appears to have been in the direction of the Rhône to Lyons. I travelled that route two months afterwards, and made repeated enquiries respecting it; near the passage de l'Ecluse, persons were thrown down by the violence of the shock, and at Lyons it was felt strongly. In the volcanic parts of Auvergne, ninety miles west of Lyons, I found its action had been very sensible. At Berne the shock was but slightly felt. In Geneva some persons were made sick by the motion of the shock; it might be supposed this was the effect of fright, but we were told that artizans in the upper stories of the houses on the island, surrounded by the Rhône, became sick, though they were not aware that there had been an earthquake. It is possible that persons intent on any operation like that of watch-making, might feel the motion of the earthquake, and suppose at the time, that they were affected with a transient vertigo, and this, from association, might produce nausea. The water of a spring within the walls of Geneva acquired a sulphurous taste.

Those Genevese who are opulent, gene-

rally retire to their country houses in April or May, and reside there till the approach of winter. On the south side of the Little Saleve, there is a village called Morney, in Savoy, where are several boarding-houses, much resorted to in summer by those Genevese who have not country-houses of their own. This village is about 2200 feet above the level of the sea, or 1000 above Geneva; it enjoys a pleasant temperature in summer, and commands a fine view of the higher range of the Alps. Those persons who have been at Geneva, and have made excursions in its environs, will probably recollect the little village of Monetier, with its church, embosomed in a mountain valley, between the Great and Little Saleve, and surrounded with orchards; there is a path to it called Pas de l'Echelle, by which you ascend the face of the mountain, by steps cut in the solid rock. In a direct line the village is about three miles distant: the carriage road to Monetier goes round by Morney, and is a journey of two hours and a half from Geneva.

A few weeks after the earthquake, one evening as we were looking out of the window about sun-set, we perceived a great light upon the mountain, which we could

not account for, and I said, *en badinant*, that a volcano had burst out on the Saleve; but it was soon known at Geneva, that the light proceeded from the conflagration of Monetier.

The Genevese, who are ever ready to assist their ancient enemies the Savoyards, when in distress, could not send engines in time to be of use, owing to the long circuit by the carriage road, nor would the engines have availed much to stop the flames, as there is no water in the village, except a small spring, barely sufficient for the daily supply of the inhabitants: their cattle are watered at a distance. The weather, which for many weeks had been delightfully clear and serene, that evening suddenly changed, and the most tremendous peals of thunder, with lightning, hail, and violent gusts of wind, added to the horrors of the poor villagers, who seeing, as they thought, the wrath of Heaven manifested against them, were overwhelmed with despair, and suffered their houses, stables, and cattle to perish, without making the smallest effort to save them, except by offering up prayers to the Virgin. An English gentleman, who had gone from Geneva by the shortest route, arrived at

Monetier at this juncture, and with great difficulty he roused a few of the Savoyards from their stupor, and persuaded them to aid him in rescuing what could be saved from destruction. By covering the roofs of four or five houses and stables with wet blankets, he prevented them from taking fire; these five houses, with the church and cross and some bare walls, were all that remained of Monetier after the fire. The poor inhabitants, deprived of all their little property, and without shelter for the night, were in the most deplorable situation, and the Savoyards in the neighbouring villages were unable to afford them much assistance.

The Genevese, however, lost no time in sending them relief. Carts, with food and blankets, were despatched the next morning, and many of the gentlemen and ladies in the city formed themselves into separate committees, for aiding the inhabitants of Monetier; one to receive subscriptions for the purchase of food, another to receive articles of clothing, old or new, and a third inserted an advertisement in the Feuilles d'Avis, appointing a place of reception for old furniture, requesting the

Genevese to examine their premises, to see whether they had any articles of lumber which might be useful, and send them to the depôt, enumerating old doors, hooks, nails, &c. &c. Respectable persons undertook the distribution of the charity. There was so much humanity and practical good sense in this unostentatious, but prompt and effective mode of relieving the subjects of another government, that I felt my favourable opinion of the citizens of Geneva greatly heightened.

The Sardinian government was applied to for some aid to its own subjects, but with what success I did not learn, as I left Geneva soon afterwards.

The country on the northern side of Geneva is more beautiful than that on the southern side, as it commands a more extended view of the Alps. A few days after our arrival, we went to the village called the Little Saconnex, by a circuitous route, and there, for the first time, the glory of the country opened on our view in all its magnificence, for the preceding days had been cloudy. It was the end of October, but the atmosphere had all the warmth and brilliancy of the finest mornings of an

English September, with a clear intensity of blue, never seen in our humid climate. The foliage had acquired the varied tints of the season, and a stillness and serenity, peculiar to the mild days of autumn, seemed spread over all nature. The mountains of the nearer and lower range of the Alps were all uncovered, but the snowy summits of the highest Alps were entirely concealed by a screen of clouds, which soon gradually rose, and, opening in various parts, discovered one or more of their gigantic peaks; then closing and opening elsewhere, displayed the deep indentations and precipices on their sides, under such varied forms, that we became impatient to see the whole at once uncovered. About noon the clouds were entirely dissipated, and Mont Blanc and the aiguilles of Chamouny stood before us in their snowy vesture, splendidly illumined by the midday sun. I had caught a transient view of Mont Blanc from Coligny, on our approach to Geneva; but, though I was six miles farther from it at present, it appeared from this station far more sublime and imposing. The nearer ranges of mountains sunk down into their just proportions, their summits

rising behind each other in succession, but beyond, and over all these towered the monarch of the Alps, and his attendant aiguilles, impressing the mind irresistibly with the certainty of their vast distance and great elevation. The contours, projections, and shadows of these enormous masses were most clearly and distinctly defined; yet, seen at such a distance, and through such a depth of ethereal space, they had a kind of transparency, which tempted the imagination to believe them formed of something more refined than gross material substance. The lake, with its cultivated borders, forms the foreground to this glorious scene.

Nowhere in the vicinity of Geneva can the effect of sunset on the Alps be seen more advantageously than from hence. There is a small auberge near the church, at the Little Saconnex, seldom visited by strangers, but where comfortable refreshment may be had. To those who wish to wait here till evening to see the setting sun, this information may prove useful.

Among the delightful villas on the north side of Geneva, there is one at Pregni, once belonging to the empress Josephine. Since

her death, it was purchased with the gardens and grounds, by our friend, Mr. M., with whom we dined soon after our arrival at Geneva, and had an opportunity of seeing the apartments: they are spacious and commodious, and well suited for the enjoyment of an unostentatious but elegant retirement. A few miles farther east, on the same side of the lake, is situated the château of the late Madame de Stael at Copey. It contains the body of her mother, Madame Neckar, full dressed, and preserved in brandy, by her own particular request. In this singular state it was shown to visitors for several years, but the vault which contained it, was closed a little before we were there. The early attachment of our historian Gibbon to this lady, will preserve her memory much longer than brandy can preserve her body; and the austerity of her temper and singularity of her disposition are sufficiently known by the writings of her daughter. The memory of M. Neckar will also remain a striking instance of talents egregiously overrated by his countrymen, and, at one period, by all Europe.

M. Rocca, the young and handsome

second husband of Madame de Stael, did not long survive his wife: he died of a decline in Italy, after lingering some time in his native place, Geneva.

Of Voltaire's château at Ferney, more than enough has been already written; suffice it to say, that nothing can be in worse taste or more paltry than the drawings and ornaments of the apartments, which are shown to visitors.

CHAP. III.

STATE OF MORALS IN GENEVA. — PARENTAL AUTHORITY, FILIAL AFFECTION. — SOCIETES DE DIMANCHES. — ECONOMY. — AVARICE. — BOARDING-HOUSES. — CELEBRATED FEMALE ALCHEMIST, HER HISTORY. — FREQUENCY OF SUICIDE, REFLECTIONS RESPECTING ITS CAUSES. — RARITY OF PUBLIC EXECUTIONS. — PRESENT CONSTITUTION OF GENEVA. — POLITICS OF THE GENEVESE.

It is not possible to appreciate the state of morals in a country fairly, without residing in it a considerable time. A stranger who enters Geneva can scarcely fail to be prepossessed in favour of the people by their appearance, particularly that of the lower orders. The men are sober and orderly, the females are plainly and neatly dressed, and almost all the children look remarkably healthy, and are decently clothed. Perhaps the highly favourable opinion he may have formed of the inhabitants, will be somewhat lowered by a closer inspection.

The principal complaint made against the Genevese is, that the shopkeepers charge more for their goods to the English, than they do to their own countrymen; but I believe this practice of charging the English an extra price, is less frequent in Geneva than in most other towns on the continent, and is far from being general. Indeed, I am well persuaded that the shopkeepers in Geneva are to the full as honest as those of London.* Should an Englishman, however, soon after his arrival, fall in company with any of his young coun-

* In London there is an evil great in extent and most pernicious in its consequences, which is at present little known in Geneva. I allude to the prevailing practice of the London tradesmen bribing the servants of the families they serve, either by allowing them a discount on all the money laid out, or by giving them large presents. Now this money, which is put into the pockets of the servants without the knowledge of their masters, the latter are compelled to repay, perhaps tenfold, to the tradesman in some form or other, either in extra price, inferior quality, or diminished quantity, which the servants are of course expected not to notice. Thus a system of fraud, that escapes the vigilance of the law, is deeply undermining the integrity of the lower classes. Few persons, I believe, who have not enquired into the subject, have any idea of the vast extent and magnitude of this evil in London.

trymen who have been some time resident at Geneva, they may probably endeavour to prejudice him against the Genevese, but he must listen to their accounts with great caution. Many of these young men come to Geneva with but little experience of the real state of society in England or elsewhere, and hence they are too apt to pass judgment on a whole people, for the faults they have discovered in one or two individuals.

Thus having found, in some instances, that the shopkeepers have charged an extra price for their articles, they will describe them all as dishonest. Perhaps the same person who would highly blame a Genevese hatter for asking him a crown more for his hat than he had done to a fellow citizen, would glory in selling a horse for one hundred guineas, either to a countryman or a foreigner, though he really knew it was not worth fifty; and while he was pocketing the money, and thinking himself a very clever, and a very honest man, he might possibly look at his hat, and bestow some hearty curses on *that confounded rogue of a Genevese*, as he would call him, who had cheated him of a crown.

In every part of the continent as well as at Geneva, workmen would consider it a kind of injustice to charge an Englishman the same price for a job, as they would the natives of any other country, for he is looked upon as an animal overcharged with pride and money; and while they feel it their interest not to meddle with the first, they regard it their duty to diminish his stock of the latter commodity to the utmost of their power. A workman thinks he has as much right to double wages from *Monsieur Bull*, as a showman in a fair has to take a sixpence from those he calls the gentry, while he lets in the common people for threepence. On the justice of this reasoning, I shall not pretend to decide. In weightier cases in morals, where interest is made the judge, the balance will be held with an unsteady hand.

For labour, in which there is much competition, prices will regulate themselves; thus, though the voituriers expect from the English more than the common fares, they are content with a small trifle in addition to what is paid by the Genevese.

I have dwelt the longer on this subject, because it is the most common complaint

made by the English against the shop-keepers and lower classes at Geneva. It will scarcely be denied, that for intelligence, sobriety, industry, and general good conduct, the latter may be advantageously compared with the best part of our artizans and labourers. Indeed the disgusting vices and extreme misery of the worst part of the population, in our large manufacturing towns, are nowhere conspicuous in Geneva.

The police, without being oppressive, is vigilant; the watchmen do not adopt the sage practice of the English watchmen, of calling the hour as they parade the streets, to tell all the rogues to hide themselves till they have passed by, but they walk along silently in list shoes, so that no notice whatever is given of their approach. The unfortunate females who make a traffic of their persons, are obliged to reside in one street, and are under the cognizance of the police. They are required to comport themselves with strict decorum in public. The morals of the higher orders of citizens in Geneva, of the negotiants, the professors, and the gentry who live upon their incomes from land and foreign funds, are

correct and exemplary; instances to the contrary are of rare occurrence. In a town of small extent, where every one is known to his neighbours, and may be said to be under their surveillance, moral restraints are more potent than in large cities; but there is a correct tone of feeling at Geneva, which would occasion any one to be coolly received in society, and even shunned, whatever were his wealth, who was guilty of any great breach of moral duty. Moderation is the characteristic virtue of the Genevese; and if Voltaire speaks truly when he says,

> "La modération est le partage du sage,"

the citizens of Geneva may justly claim the title of wise, being temperate and moderate in all their enjoyments. Gaming, as a vice, is scarcely known, except by the example of foreigners; though the Genevese are great card-players in their evening parties, it is merely for amusement, and they play for very low stakes. The sumptuary laws enforce early hours; dancing, whether in public or private, is forbidden after twelve o'clock, under a penalty of

ten napoleons; but wedding-balls, and the ball on the 31st December, to commemorate the emancipation of Geneva from the French, are exceptions to this law, and the dancing may be continued till morning, without any restriction whatever.

Conjugal fidelity, and durable affection, between parents and their children, are nowhere preserved more undeviatingly than at Geneva; and this is the more remarkable, as marriages here most frequently take place from interested motives, and seldom originate from the spontaneous affection of the parties. The authority of the parents, however, is rarely, if ever, carried so far as to compel marriage, where there is a decided aversion, but it often operates to prevent a union from affection, where one of the parties is inferior to the other in wealth or consideration in society. The education of females is more intended for use than show; they are made rational companions to their husbands, and valuable instructors to their children. Perhaps there is no town in Europe, of equal size, where the females are generally so well-informed, particularly in the principles of the

religion they profess, and the duties it enjoins. As many of the young men emigrate for employment, the Genevese ladies often marry foreigners, who become acquainted with them in visiting the city.

I have mentioned, that the affection of children to parents is more durable, and I should say stronger, with the Genevese, than with the English. I had not an opportunity of observing how far this may be the case in France, but I am informed that there also, a more lasting and affectionate intercourse is kept up, late in life, between children and parents, than we commonly observe in our own country. Now to what cause or causes can this be attributed? it may be worth while, on such a subject, to pause a moment and enquire. In England there is such a dread of any display of affection, that, to avoid this, it seems sometimes thought expedient to strangle affection itself. In great public schools, the affection of boys to their parents is not treated with much respect, but is too frequently *quizzed*, and to trick the *old one* out of money by any pretence, is considered almost as honourable as

*smouching.** English gentlemen keep their servants at a more awful distance than the French, and perhaps the same may be said respecting their sons. The formal appellations of *Sir*, on one side, and of *Dick* or *Tom*, on the other, are not, perhaps, the best that can be chosen, to keep alive kind feelings between fathers and sons. He must know little of the constitution of the human mind, who does not admit the influence of names on habitual feelings. But the great cause of the evil we are speaking of, is of a more serious nature. In a country where immense wealth and a splendid style of living are worshipped as the very first of the DII MAJORES, if they are not reckoned supreme, a young man heir to a title, or great fortune, cannot avoid feeling how much the possession of his father's estates and wealth would increase his consequence in general society: he is told it at an early age by the domestics of the family; he is daily told it afterwards by his own observation. It is one of the curses of great riches, when combined with luxury, to weaken or destroy natural affec-

* A term well known in some of our public schools.

tion; but where luxury does not prevail, riches are less pernicious in their effects. The richest citizens in Geneva live in so unostentatious a manner, that they can allow all their children to live as well as themselves; and though the death of the parent may increase the nominal wealth of the children, it can add little or nothing to their domestic comforts, or to their consideration in society.

The societies called *sociétés de Dimanches* have been correctly described by Dr. Moore; I shall therefore briefly state, that they still exist on the same footing as formerly, but not to the same extent. The parents, soon after their children are born, and sometimes *before*, endeavour to arrange with the parents of other children, nearly of the same age, for the formation of a society, or for the admission of their sons and daughters into societies already formed. This, where a family is large, is extremely embarrassing, and we have heard of parents complaining that it was more difficult to form eligible societies for their infant daughters, than to get them married and established in life. There are separate societies for each sex; they consist of

twelve or fifteen children, of nearly the same age, a difference of two or three years only being allowed. Thus it often happens, that two sisters belong to separate societies. As the parents are desirous that their children should associate with the children of parents in the same station of life, or a *little higher* than themselves, the difficulty of forming these societies becomes greater among the higher and less numerous class of citizens. These societies meet at the houses of the parents in rotation, on Sunday evenings. While the children are very young, they are attended by the *bonne* or nursery-maid of the house, but when they are nine or ten years old they are left entirely to themselves, and the parents are never present. They partake of tea, cakes, and sweetmeats, and pass the evening with music, dancing, or amusing games, according to their taste or ages. When any one of the young ladies is married, she is allowed to invite the young men of her husband's acquaintance, and the society is afterwards composed of both sexes. Persons united in the same society, generally preserve a friendship for each other through life, and contribute to

the assistance of any member who may be in distress. It is, however, a subject of complaint, that these early associations tend to limit the affections too exclusively within their own narrow circle, on which account some parents do not wish their children to belong to them. The Genevese females who marry foreigners, and leave their native city, are often haunted by the agreeable recollections of their early societies, and are too apt to regard a residence elsewhere as a banishment. The soul of a true Genevese woman is bounded by the range of the Jura, on one side, and by the Saleve on the other. The space between is her *world*, to which she ever wishes to return.

The Genevese have often been accused of an overweening attachment to money, and even some of their own writers are disposed to admit, that avarice is the too prevailing and easily besetting sin of their countrymen. I am, however, inclined to believe that the Genevese are often thought avaricious by the English residents, when they really are not so, arising from the different habits of the two nations. The French and Genevese keep their ac-

counts in halfpence and francs, hence they are unavoidably more careful of small sums, than the English who keep their accounts in pounds, and are daily familiarised with large sums. The extravagance of the higher classes in England, and the late profuse expenditure of government, has created such a rage for expense, that the great majority of the people live up to, or beyond their incomes. Among the French and Genevese on the contrary, economy in domestic affairs is habitually carried to an extreme, of which the English can form no idea; but the individuals who practise this economy are often liberal and generous to others, and therefore cannot be called avaricious. How much superior are they in moral worth, to those who spend the whole of their incomes in selfish indulgences, and the gratifications of pride.

The extent to which economy in small things is carried on the continent, struck me very forcibly, when, in Prevot's Restaurateur at Paris, in 1819. A very respectable-looking well-dressed gentleman seated himself opposite to me at table. The first dish he called for, as is customary in the winter season, was a plate of oysters.

When these were brought, he began to count, and then to examine them; during this process, he sent forth a cry of indignant reproach to the waiter which made the room ring, and lifting up one of the oysters in his fingers, he ordered the *garçon* to get it changed, as it was beneath the legitimate standard of size: an Englishman, if he had not swallowed, would at least have quietly overlooked the oyster, but Frenchmen or Genevese, will always have their full penny-worth for their penny.

It would be absurd to call the Genevese avaricious, because they let their country-houses to the English at rents which, even in England, would be considered exorbitant. The price is regulated by the demand, as in other articles, and were they to let a house for a hundred napoleons when they might readily obtain three times the sum, we might cease to blame them for avarice, but they would not escape the charge of folly. The same may be said respecting the *pensions*, or boarding-houses, the prices of which are rather regulated by the supposed rank in society of the persons who keep them, than by the superior accommodations

they afford; for many persons who are considered as belonging to the first circles in Geneva, are ready to receive boarders, if they can obtain their terms. From twenty to twenty-five napoleons per month are sometimes given, for which the table and accommodations are not equal to what might be had in an English boarding-house, for eight guineas a month. At other *pensions* the terms are from ten to twelve napoleons a month, which is relatively dearer than in England; but being *en pension* in a respectable family, is by far the easiest and best mode of becoming acquainted with the manners and feelings of the inhabitants, for they mix much with each other in their evening parties, or *soirées*, and the boarders, if well introduced, are often invited out with the family.

It is a general observation of the English, that in the boarding-houses the experiment is too often made of trying what is the *minimum* of expense at which the boarders can be kept, without exciting complaints, particularly with respect to the quality of the food and wine. If this be so, I believe it frequently arises from inad-

vertency, or a disposition to relapse into their former economical modes of living, to which they give a decided preference.

The habits of the Genevese ladies are not, in some respects, so well suited to ensure domestic comfort as those of English ladies in the middle class of society; for even those who keep *pensions* for their support, would consider it as a great degradation to superintend the purchase of provisions; the business of *marketing* is, therefore, left entirely to the servant, and a strong temptation is offered for collusion with the butcher, or other tradespeople. It is but justice to state, that during the two winters we were at Geneva, we found both the families with whom we were *en pension*, always desirous to make our residence agreeable, and ever ready to order such changes in the mode of living as were more suited to English habits. One of these pensions was kept by two respectable elderly ladies, of an ancient family, but their fortunes had been injured by the French revolution. Mademoiselle P. was the principal manager, her sister being an invalid. Mademoiselle P., when young, had been both a beauty and a wit, but what is re-

markable, her temper and disposition remained unspoiled, even in advanced life, and she preserved also much of her former vivacity, with an amiable urbanity of manners, which procured her the regard of all who knew her. She had seen many changes in Geneva, and had taken a deep interest in political events, and was full of amusing anecdote. She was devotedly attached to the honour of her little republic, and would have resented any reflection upon it, more strongly than upon herself; indeed she could not tolerate those historians who recorded any thing bad or ridiculous in the customs or laws of the Genevese. One day, when speaking against the intolerance of the law, which will not suffer a Jew to remain longer than one night in Geneva, I said, "were St. Paul or St. Peter, or any of the apostles, to come here, you would drive them out of the town." She instantly replied, "*Menez les ici, Monsieur, et nous verrons.*" As our queen Elizabeth could not bear any shade in her picture, so Mademoiselle P. would have that of Geneva drawn with none but the most brilliant colours. Yet, with singular inconsistency, she was a zealous

stickler for the rights and honours of *legitimacy*, and a most energetic enemy of all modern republicans. When seated by the fire, with her spectacles on, her knitting-needles in her fingers, and her snuff-box within reach, she was armed at all points in defence of the holy alliance, against the Carbonari. The thread of her argument moved on as swiftly as the thread of her stocking, and in defending the leagued potentates, she displayed more ability than many of their prime ministers,—she always remained unvanquished; for it seemed a religious duty with her, never to yield up her opinions. We had an Austrian minister of state in the house, who came to Geneva to have the advice of M. Mounoir, the justly celebrated oculist. During these political discussions, finding the cause of legitimacy so ably managed by Mademoiselle P., he good-humouredly resigned to her the whole defence of the holy alliance.

Speaking with one of the most respectable and opulent citizens in Geneva, on the character of the inhabitants, I mentioned the opinion which prevailed respecting their attachment to money. He said it was true that few of the rich families spent

as much as half their incomes, and many not more than one-fourth ; but then, he added, it is not uncommon at Geneva for persons to expend more annually in charity than on their own account, not in large pompous subscriptions to public institutions, but privately in assisting families in declining circumstances, and enabling them to live in the style of comfort to which they had been accustomed. If this be so, and I have no reason to doubt it, they are just stewards of the bounties of heaven, and nothing can be more unjust than to accuse them of avarice.

The Genevese are generally liberal supporters of their own charitable institutions, and as they have no poor laws, their indigent poor are supported by the voluntary aid of the opulent. On many occasions, the Genevese have also assisted their neighbours the Savoyards, very extensively, in times of scarcity, and have saved numbers of families from starving, particularly in the year 1816. Their charitable and well-timed aid, at that period, gave great offence to the Sardinian government, which *we* had recently restored. That humane and liberal government, was highly indig-

nant that its own subjects could not be left to starve to death quietly, without the officious interference of the Genevese. I have already mentioned the judicicus exertions of the Genevese, to assist the Savoyards of the neighbouring village of Monetier, when it was destroyed by fire.

If the Genevese are suffering under the unjust charge of avarice, I am therefore inclined to think it is more for the sins of their fathers than their own.

A few centuries ago, when alchemy was a prevailing folly in Europe, the citizens desired their magistrates to entice the persons most celebrated for the art of making gold to reside in their city, forgetting that persons who possessed the power of creating riches at will, were not easily to be bribed by the poor inhabitants of a little republic. This willingness to become the dupes of money-making charlatans, occasioned the following amusing imposture to be practised on the citizens of Geneva. A French woman, calling herself Margaret de Bartingo, about forty years of age, having a pleasing figure, and an insinuating address, came to Geneva about the end of the year 1660; her pretended husband

came with her, which served to sanction her pregnancy, that was far advanced. This man was in reality a monk of St. Benoit, habited like a layman: he shortly departed from Geneva, with two male domestics, leaving Margaret with only a femme de chambre. Although she was a catholic, permission was granted her to lodge in the house of Theodore Burlamaqui, a principal merchant in the city, to whom she had been recommended by a person who had only seen her for eight days at Lyons. After she had expended some considerable sums of money, with a view to convince the people that she was a lady of fortune and family, she contrived to spread about the rumour, that she possessed the true secret of the philosophers' stone. She then ordered a furnace to be constructed in her apartment, and in the presence of many goldsmiths, fifty ducats were put into it, with an equal weight of a powder, which she had provided. After the ducats were melted, she said they would combine with the powder, and convert it into gold. When all was arranged, she closed the mouth of the furnace hermetically, a seal was set upon it, and the fire

was lighted. At the end of eight days the furnace was opened in the presence of the same goldsmiths, and they found in it an ingot of gold, equal in weight to 100 ducats. The gold was assayed, and proved to be of the purest quality. The fame of the experiment spread, and excited the liveliest interest in the city. Every one was anxious to meet and hail the wonderful woman, whom heaven in its great mercy had sent to enrich the inhabitants. No sooner was she observed in the streets, than the doors and windows flew open, every one desiring to be favoured with the light of her countenance, and some were made inexpressibly happy by her entrance into their houses. The people in the streets fell into ranks to let her pass, greeting her, no doubt, with language similar to that of "Holy Willy's" prayer.

> "With golden gear bless me and mine,
> And all the glory shall be thine. Amen, Amen!"
>
> BURNS.

The gold-making catholic Bartingo was then held in higher veneration by stern Calvinists, than all the Protestant martyrs. "*Religio post nummus*," was the saving creed of the day.

This adulation, paid by avarice and folly to hypocrisy and fraud, increased from day to day; the richest citizens vieing with each other in acts of officious kindness, to ingratiate themselves into her favour. On her part, she gave splendid entertainments, and made great display of extraordinary wealth to those whom she selected for her dupes.

Margaret de Bartingo was soon after delivered of a son, who died in three days. The completion of the hopes of the Genevese was thus unavoidably delayed till her recovery; but in the interval, cupidity and anxiety occupied every mind, and the day-dreams of the citizens converted every thing they touched into gold. After her recovery, she ordered twenty-three furnaces to be constructed in the houses of those whom she styled her most intimate friends, and whom she intended to distinguish by the first-fruits of her bounty. Aided by her servant, she put into these furnaces, or rather pretended to put in, the gold which was given her, together with the powder which was to double the quantity and the weight. The furnaces were then hermetically closed, and the fires were lighted,

which were to be kept burning eight days, without intermission. The whole of these operations were completed on the Friday before Whitsunday. The following day (Saturday) she set out to perform her devotions in the abbey of Pommiers, three leagues from Geneva. She was accompanied to the bridge over the Arve by two coaches full of ladies, and by numerous citizens on horseback, who desired to honour her with their attendance farther, but she requested them to leave her, as she wanted time to meditate on the confession she had to make the following day. She therefore took leave of her followers, and proceeded on horseback, with her femme de chambre and lackey. Monday evening was fixed for her return, but Monday, and Tuesday, and Wednesday, passed away, and Margaret de Bartingo came not. They then became seriously uneasy ; a messenger was sent to Pommiers, who returned with the answer, that she had not been seen there. Yet the person where she had lodged at Geneva, said that they need not be alarmed, as Bartingo had left all her jewels, and a large sum of money in a casket, which was locked up in a cabinet in her apartments.

At the end of the eight days, the different owners of the furnaces had them opened and examined by goldsmiths. The powder was consumed, and the gold had disappeared, except the amount of a few straggling ducats in some of the furnaces.

Nothing therefore remained but to open the casket, in presence of a notary, when it was found to be filled with stones. Bartingo, by this artifice, obtained five thousand ducats from her dear friends, who had the further mortification of becoming objects of derision to the very people who were equally credulous, but more fortunate than themselves. The artful Bartingo was never heard of afterwards.

We may fairly indulge a laugh at the folly of the Genevese, but candour will oblige us to confess, that the history of Margaret de Bartingo belongs as much to the age, as to any particular nation, for numerous instances of similar folly might be cited, as having taken place nearly about the same period in our own and in other countries. According to Burnet, we are deeply indebted to alchemy for abridging the days of the unprincipled and perfidious king Charles the Second. He received his

death from the fumes of his crucible.* In later times, the tulip mania in Holland, and the South-Sea scheme in England, are instances of avaricious stupidity, which prove that nations, as well as individuals, have periods of unaccountable folly, when common sense falls asleep, and some prevailing passion usurps the ascendancy, presenting the most absurd and fantastic illusions as sober realities; as such, they are welcomed by plodding thousands, who never suspected in themselves the existence of a faculty like imagination.

Numerous acts of suicide took place in Geneva, during the two winters we were

* Mercury was the pabulum of alchemy at that period, and we may well conceive that keeping the head long over it, at a high temperature, would produce the fatal effects described by Burnet. This historian's account of the last illness of Charles, affords an instructive lesson. Insincerity and cold-heartedness marked all his conduct: after receiving extreme unction from a catholic priest, he immediately received the sacrament and the absolution of the English church, from the bishop of London, Nelly Gwyn being in his bed all the time. No sooner was Charles dead, than all his pretended friends abandoned his body to the most indecent neglect; Burnet says he was opened with so little ceremony, that bits of the royal fat and skin were thrown down the sewer, and were seen in the street, sticking upon the grate, several days afterwards.

there, chiefly among the poorer citizens. The instances were far more frequent than in any town in England containing only two-and-twenty thousand inhabitants. Some of the cases were remarkable; a female domestic, who had lived many years with a Genevese lady of our acquaintance, told her mistress in the evening, that she should sit up later than usual to finish some needle-work for herself, which, as it afterwards proved, was to prepare a funeral dress for her corpse. The next morning she rose as usual, arranged the apartment, and prepared the breakfast for her mistress, after which she went to the market, but did not return, for she had thrown herself into the Arve. A bundle was found in the course of the day, by the side of the river, with a letter addressed to her sister, requesting that when the body was found, it might be buried in the dress which she had prepared. No motive whatever could be assigned for the act, as she bore an excellent character.

A labouring man, who took charge of a farm for a principal citizen in Geneva, chanced one evening to be drinking more wine than usual, with some of his associ-

ates, in a cabaret, when a quarrel arose, on which he drew his knife, and slightly wounded his antagonist; for this he was sentenced by the magistrates to three months' imprisonment. He stated to his master, who was one of the magistrates, that as it was then summer-time, and he could gain more money by his labour than in winter, it would be particularly cruel to confine him, as he had an aged mother who lived with him, and depended on him for her support; he said he had no objection to submitting to the punishment in the winter, and would deliver himself up on any appointed day. His master, who knew him to be an honest man, prevailed with the other magistrates to postpone his punishment till winter. On the day fixed, he delivered himself up to the keeper of the prison, and remained there the full time of his sentence. It is the practice in Geneva, to confine the prisoners on certain days in the month, in dark and solitary cells, that imprisonment may be felt as a real punishment. It happened that the cell in which he was occasionally confined, was the one which had recently been occupied by two murderers before their execution;

this circumstance is supposed to have troubled his imagination, and was probably considered by him as a disgrace, he had not expected to suffer. When the time of confinement was expired, he returned to his mother, where he had the additional mortification to learn, that during his absence, his favourite nymph, Fanchette, had transferred her affections to another. His honour and his love were both wounded; he could not survive the shock, but procured a pistol, and blew out his brains.

On my return to England, I saw that Dr. Moore, in his Letters from Switzerland, has noticed the frequency of suicides at Geneva, but without attempting to assign any specific cause.

There is a certain class of reasoners, who are ready to attribute every instance of moral depravity in countries once united to France, to the influence of French principles; and as suicides are common at Paris, even among the lower classes, such persons would falsely have maintained, that the practice of self-destruction had been introduced into Geneva by the French, had we not the testimony of Dr. Moore, that it was equally prevalent forty years ago.

To discover the true cause, may, perhaps, be no easy task. Gaming, the too prevailing vice of the French, and the frequent cause of self-destruction, is not the vice of the Genevese, and there is less external appearance of misery in Geneva, than in almost any other city of Europe. That distress, either bodily or mental, real or imaginary, is the inducement to suicide here as elsewhere, cannot be doubted, though it sometimes takes place from a mere *tædium vitæ*, or weariness of life. I speak hesitatingly on such a subject, but I feel inclined to believe, that the prevailing cause of self-destruction at Geneva is pride. To explain the reasons for entertaining this opinion, it may first be necessary to mention that the *Sovereign People*, the citizens of Geneva, would consider it a degradation to follow the common useful trades of shoemakers, tailors, or carpenters, or to engage as domestic servants with their fellow-citizens. The Germans, the Vaudois, and the Savoyards, are the Helotes who perform these offices. Watch-making *may* be practised without degradation, and it used to employ nearly one-fourth of the population, women working at it as well as men;

but the trade is now overstocked with workmen, and is on the decline. Hence the young men are obliged to emigrate, as they cannot all be artists, watch-makers, or professional men, and the number of marchands and négocians is necessarily limited in a city which is rather declining in population, and does not admit of increase, as there is no space for new houses within the walls.

Where the pretensions of pride mount high, and are associated with poverty, unaccompanied by distinguished merit, severe mortification will be the frequent result, and this may lead to mental alienation and suicide.

In democratic republics, there is also an evil constantly in operation to goad and irritate the *amour propre* of the great mass of the citizens, nor has Geneva escaped its influence.

In a government where the citizens are not distinguished by hereditary rank, it is difficult, if not impossible, to prevent the formation of an indefinite kind of aristocracy arising from wealth, combined with family antiquity; and this is ever more grating to the feelings of the inferior citi-

zens than a titled aristocracy, because its rights are unacknowledged and undefined. This self-created aristocracy, must make an unceasing effort to support its assumed dignity in society; those who are supposed to be a degree below them, silently resent the usurpation; but, at the same time, they make similar pretensions to superiority over those citizens, whom they regard as one step lower down in the scale than themselves. Thus coldness, formality, and hauteur become habitual and general, and the seeds of internal and lasting hatred are sown between families; and to this cause, more than to difference of political principles, many of the former dissensions in Geneva may be mainly attributed. History informs us this was also the case in the ancient republics. A titled hereditary aristocracy, on the contrary, has its rights so well defined, and so generally acknowledged, that they excite no jealousy, and when these rights are modified, as in the English constitution, and are tempered by the possessor with intelligence and benevolence, they are almost invariably exercised with such courtesy, as to be an ornament, rather than a weight, to so-

cial intercourse. The British nobleman, who is truly respectable, will ever receive the voluntary tribute of deference and esteem, and may dispense with the laborious drudgery of constantly looking proud; whereas, with a self-created untitled aristocracy, this drudgery is the daily price paid for dignity, nor can it be so purchased, without taking with it a large portion of hatred, which greatly overbalances its value.

The prevailing information and sound sense of the Genevese gentlemen, are gradually softening down the irritation arising from the assumption of aristocratic distinction; but females in all countries yield up their pretensions to superiority in society with reluctance, and are the more tenacious of distinction, in exact proportion to their ignorance of the grounds on which their claims to it are founded.

There is no law at Geneva to deprive the unfortunate suicide of the rites of interment, as in England, a law which must be considered as extremely unfair in its operation, as it is never carried into effect, except against the poor, or against unprotected foreigners.

The code Napoleon was introduced into

Geneva after its union with France: a great part of it is still retained, except the trial by jury; which, for what reason I cannot learn, was annulled.

Public executions are extremely rare here. In the winter of 1820, two men, not natives of the city, were condemned for breaking into a house in the suburbs, and murdering the master and his housekeeper. After the sentence of death was passed on them, the citizens were much divided in opinion, whether they should be hanged according to their ancient custom, or guillotined, as there had been no execution since their separation from France. The old inhabitants, I found, were strongly prejudiced in favour of hanging*; but the magistrates ordered it otherwise, and a guillotine was erected within the

* The discussions on this subject revived an anecdote of the first introduction of the guillotine into Normandy, during the French revolution, where it is said to have given great offence. The people in some of the villages presented a remonstrance and petition to the convention, praying for the restoration of the good old practice of hanging. I heard a Genevese gentleman sing a humorous song made on the occasion, the burden of which was —

"Accordons-nous la grâce,
D'être pendu comme nos péres."

walls, opposite the Porte Neuve. The exetioner, I was informed, for want of practice, performed his office clumsily. I passed by the place an hour afterwards, but nothing remained to show that an execution had taken place, except a little sawdust, which had been scattered to cover any trace of blood, that might remain on the pavement.

After the war of the French revolution, when Geneva regained its independence, and was made a canton of the Helvetic confederacy; its constitution was remodelled. Its present government is representative. The four Syndics, or chief magistrates, who are elective, and a council of state composed of twenty-eight members, comprise the executive government. The council of representatives consists of about two hundred and eighty members; it was formerly called the council of two hundred. The members of the council of state are elected from their own body, by the council of represent-

atives, and are submitted to a scrutiny every year: if there be one hundred and twenty-six votes against any member, he loses his seat in the council of state, and returns to the council of representatives.

The council of representatives are elected by the citizens; a certain number of the members, about one-sixth, vacate by lot every year. They may be re-chosen, but cannot, if re-elected, retain their situation longer than fifteen years in succession.

There are two sessions of the councils each year: their sittings are secret, which seems a necessary regulation in so small a state, for were the deliberations public, the citizens would attend, and could not be prevented from mixing in the debates.

Each citizen, to enjoy his rights, must pay a certain sum in direct taxes, or in voluntary contribution. He must have attained the age of twenty-five years, and be provided with a military uniform and arms. The sum to be paid by each citizen, either in direct taxes, or in voluntary contribution, is stated in a statistical account of the Swiss cantons, published at Geneva in 1818, at thirty francs; but I was informed by a member of the

council, that it is at present only half that amount. Indeed, the poor citizens are discontented at the innovation of a contribution of any kind, as birth-right, and the requisite age were the only qualifications required of the sons of citizens formerly.

For more than half a century before Geneva was united to France, (in 1793,) this city had been the scene of violent political dissensions. The government was a pure democracy, but certain families were constantly endeavouring to obtain the sovereign power, or in other words, to form among themselves a permanent hereditary aristocracy. The citizens or freemen, also, were opposed to the *natives*, or those inhabitants who were *born* in the city, but had no political rights: the latter were numerous and powerful, and were desirous to share some of the privileges of citizenship. In the years 1782, 1783, the disputes increased between the citizens, and the magistracy and little council, (or council of state,) who possessed the executive power. The latter, to secure their own domination, were guilty of the highest of all political crimes, that of calling in the aid of foreign

arms, to overturn the liberties of their country, and secure themselves in power. Geneva was taken possession of by the joint forces of France, Sardinia, and Berne. Many of the Genevese emigrated, and it was at one time the intention of the English government to have granted them land in Ireland, for the formation of a colony and city, which was to be called the New Geneva, but a change of administration prevented this plan from being carried into effect. It would have been well, if this interference of foreign powers with the internal government of the little republic of Geneva, had been for ever blotted from the memory of mankind, or that this little state had been ingulphed in the waters of its own lake long, ere it had furnished despots with a precedent, so fatal to the liberties of Europe. The empress Catharine justified her interference by force with the internal government of Poland, citing as an example the armed interference of France, Sardinia, and Berne, with the internal government of Geneva. England afterwards claimed the right to interfere with the internal government of France, and to force the Bourbons upon the throne, in opposition

to the general wish of the nation.* The Bourbons, following the same example, claim the right of arranging the internal concerns of their neighbours, the Spaniards, and the Austrian government, after its success at Naples, will, ere long, think it prudent to extinguish the Swiss republics.

Of the present state of political feeling in Geneva I had some opportunity of judging, in the winter of 1821, when the Austrians were invading Naples and Piedmont, and restoring despotism with the bayonet. I was both grieved and surprised to find that many of the opulent Genevese took part with the unjust aggression of the Austrians, and rejoiced at the extinction of liberty in Italy. Their joy appeared to me perfectly insane, for the independence of the Swiss republics can

* The Honourable Mr. Wyndham, who was Secretry at War, and a zealous enemy of the French republic, made the following memorable declaration in the House of Commons, soon after the peace of Amiens. "Now," said he, "let the house prepare for a shout. During the ten years that we have been at war, the nation was never truly told what we (the ministers) were fighting for. Whatever were the pretended objects of that war, the real and only object was the restoration of the Bourbons."

only be secured by the existence of other independent free states in Europe; and whenever the allied sovereigns have fully succeeded in their impious design to crush the liberty of larger states, so surely will they, soon after, stamp out the liberties of the Swiss cantons, and that with as much ease as an elephant would crush an ant-hill with its ponderous foot.* Many of the citizens at Geneva have their treasures in foreign funds, and where the treasure is, there their hearts may be also, and they may prefer a high price of *French rentes* to all the free constitutions in the world. On any other principle but this, or an innate hatred of liberty, their joy at the extinction of Italian freedom was downright madness. The majority of the citi-

* I was informed by a senator of Berne, that soon after the marriage of Napoleon with the Archduchess, the House of Austria earnestly solicited him to suffer the Austrians to take permanent possession of Switzerland, which he sternly refused. The fact was well known at Berne. We may be assured that the object is not lost sight of, and should the crusade against liberty in Spain prove successful, Austria will find no power able or willing to preserve Switzerland from her grasp, and a grand *Te Deum* will be sung, for the destruction of republicanism in the centre of Europe.

zens of Geneva were, however, too enlightened to view with satisfaction the destruction of free constitutions in other countries, and sincerely do I hope that their own freedom and independence may long be preserved, for I am convinced that history presents few, if any, examples of a state possessing more good, with less admixture of evil, than the little republic of Geneva.

CHAP. IV.

ANCIENT GOVERNMENT OF GENEVA. — THE ESTABLISHMENT OF GENEVA AS AN INDEPENDENT REPUBLIC. — ELECTION AND PUBLIC PROCESSION OF THE SYNDICS. — A REMARKABLE ORATION DELIVERED ON THE OCCASION. — ESTABLISHMENT OF THE REFORMED RELIGION AT GENEVA. ARRIVAL OF CALVIN; EXTREME AUSTERITY OF HIS MANNERS. — HIS INTOLERANCE AND CRUELTY. — EXECUTION OF NICHOLAS ANTOINE. — THE GENEVESE PASTORS RENOUNCE THE PERSECUTING PRINCIPLES OF CALVIN. — RECENT SCHISM IN THE GENEVESE CHURCH. — ENGLISH CONGREGATION AT GENEVA. — STYLE OF PREACHING IN GENEVA. — RELIGIOUS EDUCATION OF BOTH SEXES. — PUBLIC ADMISSION OF THE CATECHUMENS AS MEMBERS OF THE CHURCH. — COLLEGE AND PUBLIC SCHOOLS. — ON THE ELIGIBILITY OF GENEVA AS A TEMPORARY RESIDENCE FOR ENGLISH FAMILIES, OR AS A PLACE OF EDUCATION FOR BRITISH YOUTH. — OBSERVANCE OF SUNDAYS AT GENEVA.

THE early establishment of the reformed religion at Geneva, gave to this city a degree of importance in the history of Europe,

to which it was in other respects noways entitled. The conversion of the citizens to the protestant faith, was preceded by the emancipation of Geneva from the domination of the dukes of Savoy, and the formation of an independant republic. The events which led to Genevese independence are intimately connected with the establishment of the reformed religion, but they are involved in some obscurity, and are no where, that I know of, stated in a concise and intelligible form. I will endeavour, therefore, to trace a very brief outline of this part of the history of Geneva, separated from all extraneous matter.

After the year 888, Geneva, with its territory called le comté de Genevois, was dependant on the kings of Burgundy; and on the extinction of their power, it passed under the dominion of the emperors, and the administration of the government was divided between the Count de Genevois and the bishop, but their powers were ill defined. The counts endeavoured to obtain the chief command, but the emperors favoured the bishops, and they were made princes of the empire by the emperor Frederick Barbarossa, who, by a

golden bull, in 1162, gave them sovereign power in the city and suburbs of Geneva, reserving to the emperors no other rights or privileges than that of having litanies sung for them during three days, whenever they should pass through Geneva.

The Counts still continued to possess considerable power in the territory called le comté de Genevois, a district which now forms a part of Savoy. They also exercised certain juridical rights in the city of Geneva. This power they were ever desirous to increase, but the last heir to to the title sold his rights to the dukes of Savoy in 1401. The citizens of Geneva also possessed certain corporate rights inherited from the Francs ; even at that period, they had their councils and four chief magistrates called Syndics, and enjoyed certain prerogatives in criminal jurisdictions, which the bishops on their installation swore to preserve. The citizens, in their corporate capacity, made treaties clandestinely with other states, to preserve their own power. Thus, in 1285, before the counts of Savoy had obtained any rights in Geneva, the Genevese made a treaty with Count Amé the Fifth, who promised to defend

them even against their own bishops. A goverment formed of such discordant elements could not be permanent. While the bishops and counts were contending for supreme power in Geneva, the citizens called in the aid of the Bernese and Friburgers, but finally emancipated themselves from the authority of both, and, favoured by France, they maintained their independance. The last duke of Savoy, who exercised authority in Geneva, was Charles the Third. The right of the *vidamat*, or court for the trial of small causes, had been long vested in the counts, and was not disputed. The syndics seemed willing to increase this power, and received Charles into the city under a canopy, which they all four supported, and treated him with servile respect. He endeavoured to obtain from the bishop and the citizens, an acknowledgment of his sovereignty, intending to make Geneva the capital of his dominions: in the pursuit of this object he exercised great violence against those who opposed him; which raised a spirit of resistance among many of the citizens, and induced them to make a treaty with the Bernese and Friburgers in February, 1526, who engaged to defend them. The

consequences of this treaty were most memorable; the dukes of Savoy and the bishops lost all power in Geneva. It was at this period that the Pays de Vaud was conquered from Savoy, and held by the Bernese as a conquered province, till the French revolution, when the Vaudois were emancipated by the assistance of France.

The Bernese, having defeated the Savoyards, retained possession of Geneva some years, and during this time they sent Farel and Fremont there in 1532, to preach the doctrines of the reformed religion. A few of the Genevese had previously embraced the protestant faith, but the great majority in the councils, and the syndics were still catholics. Notwithstanding this, the bishop and the clergy were so alarmed on the arrival of Farel, that they fled from the city. The following year they were invited to return, and the bishop and some of his clergy came in July, but finally fled a fortnight afterwards, though they were strongly solicited to remain. Two years after this, in 1535, the syndics and the councils abolished the catholic religion, the images and relics were destroyed, and the reformed religion, as taught by Farel

and his associates, was established. The following year the Bernese retired from Geneva, giving up to the citizens, the rights formerly enjoyed by the bishops and counts, by a treaty signed August 7, 1536; the territory of the city of Geneva was increased on the side of Gex and Galliard; and from that time it became an independant republic, governed by its own laws. The Friburgers were greatly offended at the Genevese for changing their religion; but the latter, to secure their independence, formed an alliance with the canton of Zuric, in addition to that with Berne. Farther to strengthen their power, the Genevese republic has ever endeavoured to secure the favour of France, as the state most able to defend its independence against the attacks of the dukes of Savoy.

Geneva, as a corporate city, does not appear to have possessed any territory beyond its own suburbs, when separated from le comté de Genevois. The addition of territory given to Geneva by the Bernese, was a part of the country conquered from Savoy, and lay principally on the north side of the Rhône. By calling in the aid of the Fribourgers and Bernese,

the Genevese had no intention to abridge the temporal or spiritual power of their bishops, but unforeseen circumstances effected much more than they had dared to hope for, and removed them from all foreign authority whatever: they were left independent of both, and members of the reformed religion.

The revenues of the church were appropriated to the foundation of a general hospital, and to the college and public library. It is not to be supposed that the dukes of Savoy relinquished at once all claim upon Geneva; they made many attempts to regain their power, but after the complete failure of the celebrated escalade, of 1601, in which it was attempted to take the city by surprise in the night, Charles Emanuel the First acknowledged the independence of the city, by the treaty of St. Julian, in 1603; yet his successors kept open their claims till long afterwards, waiting for some favourable event which might give them possession.

Thus, it may be seen, that the present form of the government, and the names of the magistrates in Geneva, are derived from very ancient usages, a municipal

jurisdiction being changed into a national government, elected by the citizens, and exercising supreme power. Before that period, the citizens might be compared to the livery of a corporate town; the council of two hundred were the common council, the little council were the aldermen, and the syndics were the mayors. On the acquisition of independence, the functions of the different bodies assumed a higher character, but the councils and syndics were annually elected.

In former times, on the election of the syndics, there was a grand public procession; the four syndics were each mounted on an ass, and decorated with the insignia of office. In this manner they proceeded through the streets, and on arriving at the Maison de Ville, or town hall, they did not alight, but mounted the staircase, seated on their asses, and rode into the council chamber in state. The same staircase remains: it is not formed of steps, but is an inclined plane, paved with pebbles; or rather there are a number of inclined planes, rising from one story to the other, till you arrive at the council chamber, which is the uppermost story. This staircase was espe-

cially intended for the procession of the syndics on their asses on great occasions.* It was formerly the custom for the senior syndic to pronounce a discourse to the general council, on the election of the magistrates. The following specimen of the eloquence of the times, is extracted from the speech of Jean Sarrasin, delivered at St. Pierre, January 1627. He undertook to explain the mystical meaning of the staffs of office of the four syndics, and of the arms of the city, and the ceremony of election. "I have spoken," said he, "of the four syndics, and the four staffs of office, (bâtons syndicaux); for as much as mathematicians set great store by their odd numbers, so *we* hold in equal esteem our even number four, full of force and mystery; in which, among other good things, (be it spoken without profanation), we find the four chariots in the vision of Zachariah,

* The procession through the city on an ass was one of great dignity, but by reversing the position, it was made disgraceful to the rider. Bankrupts were sentenced to ride through the city on an ass, with their faces towards the tail, which they were obliged to hold in their hand as a bridle; this made the poor animal very restive and dissatisfied with his burden, to the no small gratification of the populace.

the four animals full of eyes in the apocalypse, the four monarchies, the four elements, the four seasons of the year, the four quarters of the globe, the four confines of the earth, the four angles of a square, which is the strongest and most solid of all forms and measures. Nor will I forget the quadrigæ, and the four wheels, not only of the ancient triumphal cars, but of every carriage destined to support great machines, or heavy burdens; and to speak truly, the four syndics are the four wheels which support, as upon their shoulders, the weight and burden of the great affairs of the republic. They are the four wheels on which turn and roll, incessantly, the chariot of the state, conducted and reined by the queen and majesty of heaven and earth—the providence of God." This is excellent in its way, but we can match it in many of our proclamations and speeches of that period. Among others, one by no less a man than Lord Bacon, when chancellor, will fairly outdo the pomposity of John Sarrasin. King James had been granting some relaxation to the severities against catholics, that gave alarm to the people, on which a proclamation was issued, beginning in the following manner: "As

the sun in the firmament appeareth to us no bigger than a platter, and the stars are like so many nails in the pummel of a saddle, by reason of the vast and immeasurable distance and disproportion between the eye and the object, so is there such an immeasurable distance and disproportion between the deep understanding of a prince, and the shallow comprehensions of common and ordinary people," &c. Hence, of course, it followed, that they were unable to know what was good and wise in the designs of princes—a doctrine well agreeing with that of the present supporters of legitimacy.

The conquest of Geneva, by the Bernese, it has been seen, was followed by the public introduction of the protestant worship into the city, and the reformation was established here in 1535. In 1538 Calvin arrived at Geneva, and by his extraordinary talents, combined with a thirst for domination, he soon brought the magistrates and citizens under his power, and they found that, in relieving themselves from one species of spiritual tyranny, they had fallen under another that was far more oppressive—a power that followed them into their houses, and interfered with all the privacies and amusements of domestic life. At

length the interference of Calvin became so intolerable, that the council of two hundred banished him from the city; but in 1541 he was invited to return, and remained in Geneva to the time of his death. If, on his return, he relaxed somewhat in his severity towards the magistracy, his rigour against all his theological opponents was increased; some he caused to be condemned for laxity of morals, and others for the unsoundness of their faith. For, after the second arrival of Calvin, he became almost absolute, by the admission of a number of French refugees into Geneva, who received the rights of citizenship, and went about with their apostle, armed as a body guard, keeping the magistrates and the citizens in awe.

A natural chronic malady, which is described as internally tormenting and gnawing the frame of Calvin, doubtless engendered that gloomy acerbity of disposition, and those dark and fearful views of religion, by which his life and doctrines were characterised. The state of morals is said to have been very corrupt at this time in Geneva, but the fact may be fairly doubted to the extent which has been described, for the

most innocent amusements, and even any unguarded expressions in conversation, were made heinous crimes, that fell under the power of Calvin and his consistory of priests, to punish with the utmost severity. Thus the whole city was subjected to his authority, and numerous were the victims whose lives were sacrificed to appease his malignity, for it can deserve no better name. A strong party endeavoured to restrain the power of Calvin and of the clergy. They had opposed the admission of the French refugees as citizens; this party Calvin and the clergy called libertines: they were defeated; some were taken prisoners and beheaded, the others found a safe refuge in Berne.

Perhaps few of the acts of Calvin, not even the burning of Servetus, were more disgraceful than his persecution of Bolzec. After the pastor had expounded some doctrine or text of Scripture to the congregation, any one was permitted to speak; it happened one day, that the pastor had been defending the justice of God in the predestination of infants to everlasting torments. J. Bolzec, a protestant physician, from Paris, was present; he rose and

expressed his abhorrence of the doctrine, as being repugnant to all notions of divine goodness, and contrary to Scripture, and the opinions of the fathers. Calvin replied in terms sufficiently abusive; but not satisfied with this, he instigated the magistrates to imprison Bolzec, and was very urgent with them to take away his life. They were startled at the violence of the proposal, and applied to the Swiss churches for advice. Berne and Basle recommended moderation, as their own opinions inclined to those of Bolzec; he was therefore released from prison, and banished from Geneva: — he took refuge in Berne. Nothing can be more revolting than this persecution of a respectable man, for refusing to believe that the deity was cruel and unjust; nor is it possible to imagine a greater contrast than between the character of Calvin and that of the Master he professed to follow. Happy is it for the world that the reformer of Geneva could not call down fire from heaven on the heads of all his opposers, for those who were within the reach of his earthly vengeance, he was never known to spare. His conduct brought great disgrace upon the reformation, and proved to the

world, that the church of Rome was not more intolerant than the separatists.

Soon after the Reformation, the minds of religious men became unsettled by the sudden change of their faith ; and the Bible being thrown open to their examination, various strange notions and absurd systems were generated by the fermentation of conflicting opinions. This Dryden has most happily described in the following lines:

> " The thronging crowds, with rude devotion warm,
> Around the sacred viands buzz and swarm ;
> The fly-blown text creates a sprawling brood,
> And turns to maggots what was meant for food."

Nor did Geneva, notwithstanding the dread of Calvin, escape from the contagious influence of extravagant fanaticism. Among other instances, the wife of a citizen named Benoite Ameaux undertook to explain publicly the meaning and mystery of the " communion of saints," which she boldly maintained was no other than the community of husbands and wives in a Christian congregation ; and, such was her liberality, she contended that the benefit of this community should be extended to unblievers also. A doctrine so revolting to religion and morality entitled its author to a place

in the lunatic asylum, but attempts were made to subject her to a more severe punishment; she was, however, sentenced to imprisonment for life, but was afterwards liberated by her friends, as being insane: her husband was found guilty of heresy the following year.

After the Reformation was firmly established, having conquered the Pope, it was thought expedient to conquer the devil also, and sorcery was then made a capital crime, and punished with death and confiscation of property. It is an extraordinary but melancholy fact, that in the course of sixty years, 150 persons were executed, or rather murdered, in Geneva, for witchcraft, amounting to one execution every five months, for this supposed crime, in a population scarcely exceeding 12,000 persons.*

The church of Geneva did not relax in its intolerance after the death of Calvin; for under the pretence of care for the preservation of morals, the clergy still interfered with the domestic concerns of the people and magistrates, frequently abusing the latter from the pulpit, to increase their

* See Note at the end of the volume.

own consequence. The company of pastors, assuming a power superior to the chief magistrates, sometimes summoned the latter to appear before them on the most trivial occasions. Thus, in 1605, two of the syndics were present at the diversion of choosing the "*King of Beans*" on Twelfth-day; for this heinous offence, these syndics were cited before the consistory, as the pastors declared that the game savoured of paganism. The council supported the syndics, and the latter refused to obey the summons, on which the consistory of pastors excommunicated them, and forbade them to receive the communion. It was long before this dispute about the King of Beans was compromised. In 1628 a young lawyer was condemned to death for denying the doctrine of predestination, and for ridiculing some of the pastors at a masquerade. This sentence was commuted by the magistrates for public recantation, and doing penance; he was also excommunicated. Another young man was fined, and obliged to do penance for saying that some one "was as ceremonious as the Old Testament." Dressmakers and taylors were forbidden to make

their dresses in any new form, without permission from the council; so late as 1696, there was a decree issued, that no wig should descend lower than six inches below the chin; and the head-dresses of the women were not to be raised higher than six inches above the head. These regulations appear to have originated with the clergy. The laws for the observance of Sunday were so strict, that shepherds were forbidden to sound their horns on that day, to collect their flocks. No public worship of any other church was tolerated in Geneva, and in 1671 the Prince of Brandenburgh was not suffered to have the Lutheran service performed in his own house.

The case of Nicolas Antoine, a French Catholic, who embraced the Protestant faith at the age of twenty, was singularly cruel. He is described as possessing very amiable manners and correct morals, and was appointed a pastor in a Genevese church, near Gex. He was much addicted to the study of the Hebrew Scripture, and was said to be inclined to Judaism, taking all his texts from the Old Testament, and repeating the Apostles' Creed with a faint

voice. His congregation were much attached to him, and did not notice his peculiarities, till one day, preaching on the second Psalm, he declared that the prophecy did not relate to Christ, but to David. The next day he was seized with a brain-fever, and exclaimed against the Trinity. During his phrenzy he escaped from his keepers, and was taken to the hospital at Geneva, to be cured; but the pastors of Geneva desired that he might be put in prison. In this state of mental derangement he was examined, and declared to be a heretic who deserved death: he was strangled and burned under the walls of Geneva, in 1632, at the age of thirty.*

It is scarcely possible to conceive an act of more ferocious atrocity, than the cruel execution of this innocent sufferer. A few years afterwards, many of the clergy began seriously to reflect on the numerous murders with which the city was stained, either

* Picot, in his *Histoire de Genève*, has related many other instances of persecution exercised by the Calvinistic pastors of Geneva, collected from the records of the city; but out of respect to the citizens and their ancestors, he has given the most favourable account of these transactions; yet it is sufficiently horrid.

on charges of heresy or witchcraft, and they began to doubt the soundness of that faith, which produced such bitter fruits. On further examination, they became convinced that the dogmas of which they and their ancestors had been so cruelly tenacious, were unfounded in Scripture, and diametrically opposite to the mild spirit of the Gospel; they therefore made an effort to be relieved from subscription to the creed of Calvin; but their remonstrances were then ineffective. About the year 1700, they at length succeeded in effecting a change; and it was agreed, that in future pastors should not be required to believe that infants will suffer eternal torments for the sin of Adam, and other peculiarities of the Calvinistic faith. They abolished the use of unscriptural terms and creeds, formed in the dark ages of the church, and recommended the substitution of language that was strictly scriptural in its place. Farther. to prevent unprofitable disputations, their preachers were forbidden to introduce into their sermons, discussions on the doctrines of election, the impossibility of falling away from grace, and the Trinity. From that period to the conclusion of the cen-

tury, the church of Geneva "held on the noiseless tenor of its way," undisturbed by internal schisms, or external opposition; except that the Genevese clergy were accused by D'Alembert, in the Encyclopedie, of favouring Arianism. The church of Geneva is not, by profession, Arian, Trinitarian, or Socinian, but Christian. Knowing how difficult it is for a number of men to think precisely alike on all those subjects that have been made articles of Christian faith, the Genevese allow considerable diversity of sentiment, provided the preachers confine themselves to scripture language, and it would be easy to point out among them, some who incline to what is called the orthodox creed; others who incline to the faith of Locke and Newton, Hoadley and Watson; yet they live in perfect charity with each other. Happy would it have been for the Christian world, from the earliest periods of its history to the present time, if all other churches had evinced the same moderation and charity.

A schism has, however, been recently made in the Genevese church, and supported by a zealous party in England, ever ready "to compass sea and land to make

proselytes." One of the ministers, M. Malan, became a convert to Calvinism, and was desirous of introducing those particular doctrines into his sermons, which the Genevese had especially prohibited. This led to his separation from the church; on which he came to England, and found a numerous and wealthy party ready to espouse his cause. He then returned to Geneva, and sought to be re-admitted as a minister into the Genevese church; but he was refused. On this, by the aid of subscriptions, principally from England, he built a new place of worship out of the city, near to the western gate, and collected a congregation. The doctrines and style of preaching resemble those of the Methodists who are followers of Whitfield, with this difference, that the plain honest extravagance of English Methodism, dressed in the French garb and manner, has rather a grotesque appearance.

The Genevese were in general much offended with M. M. for making a schism in the church, and speak of him in terms of disapprobation and ridicule, which no friend of religious toleration can approve. From the peculiar motions of the preacher,

and the great appearance of sanctity in his followers, the Genevese have given to the new sect the name of *Momiers;* and as M. M. has derived powerful aid from England, and has in his house a number of English pupils from opulent families, who wish to support his cause, they say that he has found godliness to be profitable even in this life; and certainly he has lost no temporal wealth by leaving the church of Geneva. On the other hand, M. M. in his pulpit speaks of himself as a man suffering great persecution, and of his fellow-citizens, as being in a state of spiritual darkness. It would be better for both parties quietly to pursue the path they think right, without going out of the way to abuse each other. I believe the Genevese preachers never notice M. M., nor his doctrines from the pulpit; though they sometimes attempt to expose the superstitious practices of the Catholics, of whom they have more dread, as the population newly added to the republic is principally Catholic.

M. Malan adopts the Genevese mode of catechising the children, of course suiting the doctrines to his own views; but in

endeavouring to make intelligible some of the mysteries of Calvinism, he often leaves the comprehension of his pupils in the rear. One morning when I was present, he was attempting to make a child explain the effects of faith and works. "Is it," said he, "faith that produces works, or works that produce faith?" The child hesitated, then tried to speak, but could say nothing. By way of putting the question in a more intelligible form, M. M. called the child by his name, and asked him whether he knew the difference between a seal and the mark which it made. On the child answering in the affirmative, he added, "*Dites-moi: est-ce le cachet qui fait l'empreinte, ou l'empreinte qui fait le cachet?*" The boy paused a little, and said, "*C'est l'empreinte qui fait le cachet.*"* I thought there was an even chance that such would be the answer; but I observed that it made all the congregation smile, and M. M. passed on to the examination of another boy.

The Genevese government has granted

* Is it the seal that makes the impression, or the impression that makes the seal? Answer.—It is the impression that makes the seal.

the free use of the chapel at the hospital to the English, where the service of the Church of England is performed every Sunday morning, beginning at eleven o'clock. A few over-zealous persons were not satisfied with the free liberty to worship in their own way, without they could attack the Genevese church; and were not contented with Mr. R., the English chaplain, though sincerely attached to the doctrines of the English Church, and doing honour to his profession by his exemplary conduct and amiable manners, because he would not make his pulpit a theological battery, to annoy those who had lent him the use of it. An effort was made to remove him, and introduce another clergyman, who was said to be a sturdy champion of Calvinism; but the good sense of the great majority of the English residents prevailed, and Mr. R. was requested to remain.

Every candid person must censure any attempt of the English to interfere with the affairs of the Genevese Church, as the Genevese evince no wish to make proselytes, or disturb the faith of the English residents. On the contrary, they have shown, as I have before mentioned, a readi-

ness to grant the English every accommodation for public worship, according to the doctrines and forms of their own church; and as the clergyman may state those doctrines with all boldness, it would be returning evil for good, to abuse and anathematize the Genevese, because they may not, on all points, agree with him.

I should not have referred to M. Malan, but the schism in the church at Geneva has excited more attention with a certain party in this country than at Geneva itself; and printed letters have been circulated by Englishmen in that city, stating that the British youth who were educated there were in danger of being corrupted: an accusation most unfounded and unjust. There is no town in Great Britain, nor I believe upon the continent, where a young man's morals would be so little exposed to danger, from temptation of any kind, or from the contagion of bad example, as at Geneva; and whatever his religious principles may be, he will be as secure from any attempts being made to change or subvert them, as he could be in any part of the world.

It would be difficult for an Englishman

to give an impartial opinion on the style of preaching on the continent, even could he dismiss all predilection for particular doctrines. We have, it is true, a great variety of style in pulpit oratory among us, between that of the polite and courtly preacher, and the extravagance of the earnest declaimer by the road side; yet the preaching in Geneva would scarcely find an admirer among any class of English hearers. The sermons are delivered memoritèr, and are not deficient in logical arrangement; the manner of the preacher is energetic, and the discourse proceeds without hesitation *usque ad finem*; but it too frequently fails to carry the hearer along with it. Too much art and labour, and too great an effort to be eloquent, are almost always apparent; hence their preaching has seldom the easy fluency of our extempore preachers, nor the force of a well-delivered written discourse. The action is also too theatrical, and the tones are often affected; certain expressions, such as *mes chers frères*, being always delivered with a tremulous drawl, to make them impressive. Sometimes, however, the

inspiration of the subject raises their best preachers above these defects, and they are truly eloquent.

I am convinced, that much of what we should regard as faulty in the Genevese style of preaching, originates in the regulation by which the clergy are removed every week from one church to another; for they are not allowed any fixed place of duty in the city, but a bill is published every Saturday, announcing the names of the ministers who will officiate during the ensuing week in the different churches, and the hours of commencement. Whether this regulation be intended for the ease of the preachers, to diminish the labour of committing a number of sermons to memory, (as the same sermon may now be preached in different churches,) or whether it originate in the wish to prevent spiritual domination in the republic, I know not; but I am inclined to think, that its advantages are overbalanced by its inconveniences. The citizens of Geneva, instead of going regularly to their own churches, examine the weekly bills, as we should do the advertisements for any public exhibition, to discover where the best performers

are to act. Thus the celebrated preachers are followed by crowds, and it is difficult to obtain a place without going a considerable time before the appointed hour. The natural consequence is, that preaching is too much regarded as an exhibition of eloquence, and a contest for popular applause.

The memoriter mode of preaching is, I think, liable to many well-grounded objections. Among those sects of Christians who believe their preacher to be supernaturally inspired, a written discourse may be strongly objected to; but those who have humbler notions of pulpit oratory, do not act wisely in compelling every minister to commit to memory a sermon of forty minutes in length, whatever be his retentive capacity.

It is true, that an extempore orator, fully master of his subject, and who delivers his sermon in a natural and energetic manner, will excite more attention, and produce a stronger impression, than he who reads a written discourse. Yet, if the preacher cannot trust freely to his own powers of ready utterance, but is obliged to commit to memory the sentences of his discourse,

it must create a degree of restraint destructive of all natural ease and grace, and the audience will instinctively feel, that his mind is more occupied with the words than with the subject. He will seem to them a kind of preaching automaton, wound up and set to go a certain time; and a degree of fear and anxiety will be experienced, lest some stop should take place in the movements, before the sermon runs down to the conclusion. Perhaps it would be possible to to unite the advantages of written and extempore preaching, by allowing the pastors a discretionary power of using either in the same discourse; thus the parts which were explanatory or argumentative would lose nothing of their force by being read, while the admonitory and persuasive parts would be made more impressive by flowing spontaneously, as the preacher might feel inspired by the subject. The prayer before the sermon is the composition of the preacher, and is delivered extempore with great seriousness and devotion; but the rest of the prayers are *read* from certain printed forms which are generally short. It seems truly extraordinary, that the same man who can deliver a long sermon without notes,

cannot repeat by memory these short prayers, which he has read a thousand times; instead of which the pastor generally lifts the book close to his eyes, and mutters over the prayers, like a school-boy reading his lesson. Now, surely, this part of the service had better be entirely omitted, unless it be performed in a manner suited to excite feelings of profound veneration for the invisible Almighty Power, in whose immediate presence the pastor ventures to present his petition.

I am aware, that in making these remarks I approach slippery ground, and expose myself to a retort, which it might be difficult entirely to repel. A Genevese might exclaim, "Is it for an Englishman to point out the cold formality of our prayers?—Let him tell us then, what religious feelings are excited, or are ever supposed to be excited, by the long morning and evening prayers in schools, colleges, and cathedrals; or what devotion accompanies the daily prayers before both houses of parliament?—Are not these always regarded as irksome drudgery, both by those who are compelled to hear, and those who are compelled to perform the service?"

But what is bad in one country cannot be justified by what is worse in another; and though our prayers of mere ceremony are hurried over as such, the prayers in the regular hours of public worship in our parish churches, are almost always read with propriety and becoming seriousness.

The Genevese clergy, or pastors, as they are called, are highly respectable. Their salaries are too small to maintain a family; but most of those who have but little private property, increase their incomes by taking pupils; others marry the daughters of opulent citizens. The moral character and attainments of the candidates for ordination, are scrupulously examined before their admission to the ministry; and as they generally distinguish themselves in private life by the excellence of their example, and their active zeal in promoting the cause of virtue and humanity, they justly possess the esteem and confidence of their fellow citizens. I was told, that the pastors at Berne are regarded by the aristocracy as an inferior cast, being chiefly the sons of farmers; but the Genevese, who have more taste for science and literature, treat their clergy with the respect due to learning and

moral worth, whether they can or cannot claim alliance with the first families in the place. If I have mentioned their labours in the pulpit with less respect than their own countrymen may think them entitled to; I am ready to admit that their attention to the religious instruction of the youth of both sexes, in every situation of society, whether rich or poor, is entitled to unqualified praise. Ministers are appointed who devote four days in every week to the purpose; the young people, from about sixteen to seventeen years of age, are divided into classes, to suit the hours of attendance to their convenience; a regular course of instruction is gone through in one year, on the history, evidences, and doctrines of Christianity. The boys are publicly examined in two of the churches on the Sundays, and the manner in which this is done is particularly clear and judicious. No unintelligible questions are proposed, couched in quaint or mystical terms, according to the words of a printed form; but the subjects are stated in the simplest and plainest manner, and the boy to whom the question is addressed, is expected to answer it in his own language, and to give

additional explanations, if there remain any doubt whether he comprehended fully the nature of the enquiry. During the year of instruction, the female catechumens are expected to abstain from balls or public amusements, that their attention may be exclusively devoted to serious studies. Perhaps there is no city in Europe where all the youth receive so complete a course of religious instruction as at Geneva. Protestant families often come from distant parts of the continent to reside a year in this city, that their children may go through the annual course of religious education.

When the catechumens have completed their course, there is a religious service on the Thursday at St. Gervaise and the Cathedral, during which the boys are publicly received as members of the church, and on the following Thursday a similar ceremony takes place with the young women. This ceremony is simple and interesting. The female catechumens are dressed in white, and wear long white veils; seats are appointed for them fronting the pulpit, and other seats are set apart for the relations who accompany them. When we witnessed the ceremony, a very impressive sermon

was delivered on the duties of females, and their future influence on the religious and moral character of society, in their situations as daughters, sisters, wives and mothers; after which the catechumens were called upon to stand up before the congregation, as a public act of acknowledging their belief in the truth of Christianity, when a solemn exhortation was addressed to them, as newly received members into the christian community. The children, the parents, and the congregation, were deeply affected, and in tears, during this part of the service. On the following Sunday, the newly received members of the church partook of the Lord's supper. There is no imposition of hands by the minister during the ceremony.

The college at Geneva for teaching Latin, Greek, and French, was founded a year after the Reformation; and in 1559, an academy was instituted for literature and the sciences, and professors were appointed for each department.

Beside the college, (which may be called a large public grammar school,) where the children of the citizens are educated, masters are paid by the government for in-

structing the children of the poorer classes in the evening. The parents pay a very small sum per week, probably to make them attentive to the regular attendance of their children. These schools are open from six o'clock to nine for the boys in the winter months, and for the girls in summer, that the latter may not suffer from the weather in going or returning. The children are taught reading, writing, and arithmetic; and as it is thought proper not to leave the mind an entire blank, they also learn something of history, natural history, geography, and astronomy. To those who travel, this kind of knowledge may be useful; nor can it be without its advantages to those who remain at home, if it be desirable that all men and women should be reasonable and thinking beings, which none but bigots or ultra legitimates, who wish to profit from the ignorance of the people, can deny. We were several months in Geneva before we were acquainted with the existence of these schools. One evening, being on the Place St. Antoine at sun-set, we observed two children, evidently of the lower class, in deep conversation. The one was about nine,

the other about six years of age. The elder was explaining to the younger the cause of the sun appearing to move and sink below the earth, from the earth's turning round on its axis. A conversation so unlike that of the poorer children in England, excited our surprise; and on mentioning the circumstance, we were informed of the evening schools. We learned also, that the elder boy (whom we saw frequently afterwards) was remarkable for his display of talent. There are also two Lancasterian schools, and an orphan school for the poor. The latter establishment is for the orphan daughters of citizens: they are boarded and educated till they are fifteen years of age.

With respect to the eligibility of Geneva, as a place of temporary residence for families, or for the education of British youth, I must leave parents to make what inferences they please from what I have already stated. It may, however, be right to say something respecting the expense of education. Those who wish to economize should not send their children to Geneva for education: the terms for respectable boarding-schools for boys or

girls under fourteen years of age, are eighty napoleons and upwards per annum. Young men received as parlour boarders, or as pupils, into the houses of professors who take only from four to five pupils, pay very high. I have heard of three hundred napoleons *per annum* being given. Parents who have large families, and who educate their daughters at home, may save something in the expense of masters; the price *per* hour for attendance is from two to five francs. There are excellent drawing masters; but the music-masters are regarded by the English as inferior to our own. In every respect Geneva may be considered as dearer than other towns on the continent; but it possesses the advantage of being a Protestant city, and of being free from the immorality and dissipation that prevail in many cities, which might in other respects be more eligible.

One of the objects generally sought in sending young Englishmen to Geneva, is to acquire a facility of speaking the French language. The French of the Genevese is in a great measure free from the vicious pronunciation of the Germans, but it is less distinctly articulated than at Paris.

It is scarcely necessary to speak of the abilities of the teachers, or the course of studies generally pursued at Geneva; for excepting modern languages and natural history, this city does not possess any particular advantages for study over our own country, though some persons will think the mode of instruction preferable to that of our public schools, as less time is wasted on Greek and Latin prosody, and the knowledge of words, is made more subservient to the knowledge of things.

Young Englishmen, about to make the tour of Europe, would find a winter residence of six months at Geneva, in a respectable Genevese family highly useful; nor would it be less so to their tutors, if (as is frequently the case) the latter are taken fresh from one of our universities, and have never before visited the continent. Such tutors, however learned or truly respectable they may be, can only discharge their duty imperfectly. Unacquainted with manners and modes of thinking different from their own, and wanting that facility in speaking and understanding the French language, which can only be acquired by a residence on the continent,

they will associate chiefly with the English, and seeing only "the surfaces of things," they can be of little use to their pupils in what relates to the enlargement of the mind, or the real improvement to be gained by visiting foreign countries. On their return home, they will find themselves only just beginning to be qualified for the duties of a travelling tutor, if those duties comprise more important objects than merely regulating the expences, or speaking to the post-boys and waiters on the road.

The facilities for studying natural history are greater at Geneva than in England, but they are by no means equal to those in Paris.*

* The facilities for the study of natural history at Paris are truly enviable: beside the lectures which are accessible to the public, the museums are arranged according to the most approved systems, and every thing has its name affixed. The student, with Cuvier's Règne Animal, or with Hauy's Mineralogy in his hand, may gain what information he requires. Where the labels are only partially affixed, and no well-known arrangement is followed, a public museum, however rich in specimens, is little better than a splendid toy-room. Some of the professors at Geneva have private collections, and give lessons in mineralogy. M. Andrew de Luc has also a very extensive collection of shells, both recent and fossil, and those who wish to study conchology,

There is an excellent botanical garden, well arranged, under the superintendance of M. de Candolle. A public museum is forming, intended to comprise the animal and mineral kingdoms, and a considerable number of animals and mineral specimens are already collected and arranged. To the museum is attached a library for the use of subscribers, and also a reading room and news room, in which all the periodical scientific journals in Europe are taken in, with the French, Italian, and German newspapers. To this room, strangers, properly introduced, are admitted gratis. Annexed to the reading-room, is a room for conversation and chess. These rooms are open from nine o'clock in the morning to ten or eleven in the evening, and are a most agreeable accommodation to those who may spend a few months in Geneva. The last winter I was at Geneva, a course

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may take private lessons in his museum, where they may gain a knowledge of the system of Lamarck, and cannot fail to be pleased with the agreeable manners and intelligence of their instructor. M. De Luc is advantageously known by his able illustration of Hannibal's passage over the Alps, published about four years since.

of lectures on natural history, by subscription, was delivered for the benefit of the Museum, the different departments being undertaken by six gentlemen, without any emolument. M. de Candolle lectured on the mammalia and crustacea, following chiefly the arrangement of Cuvier, in his *Règne Animal,* but with some slight difference in the collocation of the orders. His lectures were extemporaneous; and the clearness, rapidity, and eloquence, with which he illustrated his subjects, were not less surprising than delightful. By way of enlivening the description of the structure of animals, he introduced many interesting particulars respecting what he called *leur morale,* or their natural dispositions, and the changes they underwent when under the dominion of man. Among other instances of the strong affection which tame wolves had sometimes shown to their masters, he mentioned one which took place in the vicinity of Geneva. A lady, Madame M., had a tame wolf, which seemed to have as much attachment to its mistress as a spaniel. She had occasion to leave home for some weeks; the wolf evinced the greatest distress after her departure, and

at first refused to take food. During the whole time she was absent, he remained much dejected: on her return, as soon as the animal heard her footsteps, he bounded into the room in an ecstasy of delight; springing up, he placed one paw on each of her shoulders, but the next moment he fell backwards and instantly expired.

In speaking of Geneva as a place of education, it may be proper to mention the public amusements. The theatre is open in the winter months; the hours of performance are from half past six to half-past ten. The magistrates are particularly attentive that nothing indecorous should be exhibited on the stage.

There is a subscription ball once a week, during the winter, called la Redoute, which is well attended by the first families in the place; all respectable strangers resident in Geneva are invited.

On the 31st of December, there is a public ball in the theatre, to celebrate the anniversary of the Restoration of the Republic, to which citizens of all classes subscribe. Foreigners who are in Geneva receive invitations: it is a truly agreeable spectacle, to see the citizens of this little

republic united and joyous on such an occasion.

The Genevese are almost constantly engaged in their evening tea parties or soirées. Cards form the amusement of the elder part of the company: they play for very trifling sums, gambling being discouraged. The younger part are amused with dancing, music, acting charades, or other juvenile games, which agreeably fill up the evening. To these soirées, no respectable young foreigner will find difficulty in gaining access, when he is known.

The Sundays are more strictly observed at Geneva than in most of the towns on the continent; during the hours of service the city gates are shut, and carriages are not permitted to drive through the streets. The churches are well attended; but when the morning and afternoon services are over, the Genevese, like the other inhabitants of the continent, whether Catholic, Calvinist, or Lutheran, indulge in their common recreations; and the places of public amusement are open, but they close at an early hour. The majority of Catholics and Protestants (except in Great Britain) agree that the sabbatical observance

of the first day of the week, farther than by devoting a part of it to public worship, is not enjoined either by the precepts or the example of the earliest Christians; and even since the Reformation in England, royal proclamations were fixed upon our church doors, commanding the people to play at foot-ball and other pastimes, after the service was over. Few reflecting persons would wish to see the continental mode of passing the Sunday introduced into England; for independently of other considerations, the day would soon be claimed by the farmer and manufacturer, from their dependants, as a day of labour. It cannot be denied however, that persons who are engaged in hard labour all the week, require something beside repose and instruction on the Sunday; and while the rich, who can have amusements every day, give grand dinners and concerts of music (called sacred) on the Sunday, it seems unjust to deprive the poor of all enjoyment. The Sunday games which King James ordered for the people were too noisy and contentious for a day of rest; but could any mode of recreation be devised for Sunday evenings, that should combine instruction

with amusement, and keep the labouring classes from the ale-house, I believe much would be done towards humanizing them: and this is still wanting; for notwithstanding all our religion and boasted civilization, the number of horrid murders and atrocious crimes which the daily papers relate, lead foreigners to believe, that the English populace is the most brutal in Europe. All attempts to convince them to the contrary are answered, — "*By their fruits ye may know them;*" and to this answer there is no replying.

CHAP. V.

GENEVA TO LAUSANNE. — COMPARISON BETWEEN THE LAKE SCENERY OF GREAT BRITAIN AND SWITZERLAND. — COUNTRY ROUND BERNE. — ARISTOCRACY OF BERNE. — POWER OF THE PEOPLE. — EXPULSION OF M. HALLER FROM THE SENATE. — CABINET OF PROFESSOR MEISSNER. — PUBLIC MUSEUM. — BERNESE OBERLAND. — LAKE OF THOUM. — RESIDENCE AT INTERLAKEN. — GRINDELWALD. — MELANCHOLY ACCIDENT IN THE GLACIERS. — PASSAGE OF THE WENGEN ALPS. — AVALANCHES. — VALLEY OF LAUTERBRUN. — LAKE OF BRIENTZ. — MEYRENGEN. — NEW SECT OF ADAMITES. — PEASANTRY OF THE OBERLAND.

After reposing a few days at Geneva, we were desirous to employ the remainder of the summer in exploring the Bernese Oberland, the canton of Friburg, and a part of the Upper Valley of the Rhône, which we had travelled through the preceding year. We engaged a Bernese open carriage at Geneva, to convey us to Lausanne and Berne. I was somewhat curious

to ascertain, whether, after a long residence amid the alpine scenery of Savoy, the enchanting views in the vicinity of Lausanne would lose any of their interest; but this was not the case: the natural beauties here are of that transcendant kind, that they can scarcely be lessened by comparison with any other. Persons long familiar with the lake scenery in our own island, are generally somewhat disappointed on their first arrival at the lake of Geneva, expecting to behold scenes incomparably more sublime than any around the British lakes; but beauty, rather than sublimity, is the characteristic feature of this lake, except at its upper end, where we obtain a glimpse of some of the higher Alps. An Englishman, when he arrives in Switzerland, sees objects through a medium so much more transparent than what his eye has been accustomed to, that they seem much less than they really are; and mountains which are six or eight thousand feet high, do not appear more elevated than those round Ulswater or Keswick, because the distinctness of the outlines, and the vividness of the colouring, greatly diminishes the appa-

rent distance.* On this account, the longer the scenery of the Alps is examined, the greater will be the gratification of the tourist, for he will learn to appreciate more correctly the magnitude of the objects presented to his view. Of all the British lakes, Winandermere has most of the *riante*, or cheerful character, which is the distinguishing feature of the Lake of Geneva. Loch Lomond, though more nearly approaching to it in magnitude, has an air of melancholy grandeur which destroys all resemblance. The Swiss lakes, and those of Savoy, are not ornamented with wooded islands, which add so much to the beauty of some of our British lakes. Laggo Maggore, in this respect, has the advantage of the Lake of Geneva; but the weather was too unfavourable when I was there, to admit of my making a fair comparison between the relative beauties of the two principal lakes, on the northern and southern side of the Alps.

After leaving Lausanne, and ascending

* Berkley has ably proved, that vision is a symbolic language as much as speech, and requires to be learned by practice before the symbols can excite correct ideas in the mind.

the mountain of Jorat, north of that city, we proceeded leisurely to Berne, sleeping the first night at Payerne. The Alps disappeared when we had passed the highest point of the Jorat, (3200 English feet above the level of the sea,) and began to descend on the other side; and they were not again visible until we approached Berne. The country through which we travelled had very much the appearance of the midland counties in England, being well cultivated, and without vines. The Roman remains at *Avenche*, the antient *Aventicum*, have been often described, as well as *Morat*, ever memorable for the signal victory gained by the Swiss over the Duke of Burgundy and a numerous army, in 1457, in which the duke lost 30,000 of his men, and the Swiss only 700, if we can credit historians. The great destruction of the Burgundians was occasioned by their falling back on the Lake of Morat, into which they were driven by the impetuosity of the Swiss, and most of them were drowned. A column is now erecting to commemorate the memory of this victory.

The Lake of Morat presents nothing to arrest the attention of the traveller: it has

evidently formed a part of the Lake of Neufchatel, which is also seen from the road.

The country round Berne is highly cultivated, varied, and rich; and the city, being considerably elevated above the river Aar, has an imposing aspect. The public walks and grounds are kept in excellent order, and every thing here presents an appearance of neatness, comfort, and opulence. The most striking feature in the landscape is the northern range of the Swiss Alps, that separates the canton of Berne from the Vallais, extending in a north-easterly direction above the valley of the Rhone, and running nearly parallel with the chain of the southern Alps that separate the Vallais from Italy. These two great chains, which comprise the loftiest mountains in Europe, seem to blend confusedly into each other, as they advance farther eastward, in approaching the Tyrol. The northern chain is seen from Berne, along a line of about sixty miles; and all its highest summits are most distinctly conspicuous, the bases of the mountains being more detached from each other, than in the southern chain. Fifteen of these magnificent moun-

tains are seen at once, with their snowy summits towering from ten to twelve thousand feet above the surrounding country, without any intervening object to obstruct the view. The sublimity of the view, in the evening, when all these colossal masses are splendent with the rosy tint of the setting sun, resembling pyramids of ruby, is not to be described. The walks in the church-yard, or on the trenches, at Berne, are good stations for observing the effects of sun-set on the Swiss Alps; and the scene would richly reward the labour of a long journey to behold, were there no other object worth notice in the canton of Berne. The rose-coloured tint on the snowy Alps, continued about fifteen minutes in the clear evenings in October, remaining the longest on those mountains which had the greatest elevation, and were situated on the western end of the line.

A Bernese family on a visit at Geneva, with whom we had become acquainted, had apprised their friends of our coming; and we were scarcely arrived at the inn, before we received calls, and an invitation to dinner at the country-house of one of the first families in the canton. The house was

beautifully situated above the valley of the Aar, on the road to Thoun, and commanding a fine view of the Swiss Alps. Simplicity, neatness, and substantial comfort seemed to characterise every part of the establishment; the furniture, the table, the equipage, &c. I could not avoid reflecting how generally real enjoyment is sacrificed, in my own country, to fashion, luxury and display. With all their external simplicity, however, it is well known, that the aristocracy of Berne have as high an estimation of their own importance, and are as little disposed to yield any of their privileges, as the *titled* aristocracy in any country in Europe. The canton of the Pays de Vaud was gained by the Bernese from the dukes of Savoy, in the sixteenth century and was ever after treated nominally as a conquered country. Though the government of the Bernese was mild, compared with that of Savoy, it was still galling to the pride of the Vaudois, who were regarded as beings made of an inferior sort of clay to the ancient seigneurs of Berne; hence, a bitter hatred took root, which led to the separation of the Pays de Vaud from Berne at the conclusion of the late war; but

the Bernese look forward to some future change which may re-establish their dominion over the Vaudois. Had the council of Berne acted towards the Pays de Vaud with the liberal policy of the ancient Romans, and incorporated the country into their own, with a community of rights, there cannot be a doubt but that the union of the two cantons would have been a mutual benefit to both. As it is, the germs of future disunion are deeply sown in the Helvetic confederacy, which Austria will endeavour to take advantage of; for that state has never lost sight of the possession of Switzerland. But it was too much to expect from the Bernese, in the sixteenth century, correct and liberal views of government; for there are few countries professing to be free, where the principles of government are even now, less understood than at Berne. The doctrine of the divine right of kings and governors, as maintained by the Tories in the time of the Stuarts, is still cherished here in its full extent. But, however defective the theory of the Bernese government may be, the practice is excellent; for though the people are very imperfectly represented in the councils, the

real power resides in them: they are all armed, and what may be thought strange in modern times, they pay no taxes *; the public revenues arising from lands and forests being sufficient to defray the expences of the state. Such being the situation of the people of Berne, the government could not oppress them if it were even desirous to do so, which it is not: it is truly a paternal government, employing its authority to promote the benefit of the whole.

The government of Berne has been lately accused of intolerance, in excluding from the senate one of their first citizens, for embracing the catholic faith; but the merits of the case have been very imperfectly understood in England. M. Haller, son of the celebrated Haller, enjoyed high consideration in Berne: his principles were ultra-aristocratic; he had mixed much with the politics of the continent, and had ever taken the part of the rulers against the people. He was a special favourite of the Austrian government. It was not, however, his high aristocratic,

* The only impost which affects the farmers or peasantry, is a stamp on paper for contracts, deeds, &c.

or rather despotic principles, which rendered him obnoxious to the Bernese government; no man was more highly esteemed by it. Whatever were the motives for his change of faith, M. Haller kept them a profound secret from his family and fellow citizens, as well as the change itself; and when the rumour was spread and generally believed that he was become a catholic, on being interrogated by the senators respecting its truth, he assured them that he would never change his religion, and he afterwards attended the public service of the protestant church. But when he made this declaration he had already been received a member of the church of Rome, and had obtained from it a dispensation to attend the protestant worship, with a view to conceal his conversion from his fellow citizens. Such, I was assured by a Bernese senator, was the true state of the case; and if so, it will readily be admitted, that there was so great a want of sincerity (to call it by no worse a name) in this conduct, as would have justly entitled him to expulsion, from any assembly of honourable men. Since the conversion of M. Haller

to the catholic faith, he has, I am informed, been made a member of the Aulic Council by the Austrian court.*

Professor Meisner, of Berne, has an interesting cabinet of natural history, in its different departments; the most remarkable object which it contains is a perfect fossil tooth of a small species of mastodon, and one less perfect; both found in the roof of a bed of coal at Alpnach.

The extraordinary fact of teeth and bones of the large mammalia occurring at a great depth under a series of regular strata, is deserving of much attention. The professor obligingly gave me a specimen of the stratum containing the bones, and a section of the mine in which they are found. The strata consist of—

No.		
1.	Light grey sandstone -	24 feet.
2.	Light grey limestone, like that of the Jura - -	24 do.
3.	Molasse, or soft sandstone	227 do.

* I was told at Geneva, that M. Haller had published a defence of the principles of the Holy Alliance at Naples, in which he attempted to prove, that sovereigns are not bound by their oaths to subjects; a doctrine which is not without its defenders in this country.

No.		
4.	Light grey sandstone, with mica, like No. 1. - -	6 feet.
5.	Light grey argillaceous limestone - - -	1½ do.
6.	Bituminous shalc in layers	7 do.
7.	Stink stone—a bituminous limestone, with fluviatile shells, and bones - -	½ to 2 do. the roof of the coal.
8.	Coal - - -	6 inches.
9.	Schist highly bituminous	6 to 8 do.
10.	Coal - - -	2 do.
11.	Bituminous clay - -	6 feet.
13.	Molasse and sandstone -	66 do.

I must refer the reader to the Appendix to the present volume, for further observations on this singular geological fact.

The professor accompanied us to the Public Library and Museum: the latter contains a splendid display of the zoology of Switzerland. The quadrupeds and birds are well preserved, and the attitudes in which they are placed are natural and spirited. I was much surprised to see so great a variety of species, unknown in the British isles. The lynx, which Cuvier, in his *Regne Animal*, describes as having disappeared in Germany, still exists in the Haut Vallais. It is nearly the size of a wolf, and is a formidable animal to the chamois: it is

the true tiger of Europe. There was another animal, interesting from its history — a dog belonging to the convent of St. Bernard, that had saved, at different times, the lives of forty travellers; when it grew too old for service, it was sent to Berne, but died soon afterwards. Among the birds were a pelican from the Lake of Constance, and a flamingo from the Lake of Morat. The *lemmer-geyer*, or lamb-destroyer, the largest of all birds of prey on the old continent, is from nine to ten feet between the end of the wings, when spread out: the head and beak resemble in shape that of the vulture, with long hairs or bristles on the beak; its other characters are similar to the eagle, and it feeds on live prey. As this bird breeds only in the higher Alps, in situations utterly inaccessible, it will probably long remain an inhabitant of Europe.

In the dry fosse of the trenches at Berne, several of the rare living animals of Switzerland are also kept; they have considerable space for exercise: nor must I omit the guardian genii of the republic, the long celebrated *bears*. A paved court, and cells in the trenches, are appropriated to their service; and they do credit to their hosts, for

they are the fattest bears I have ever seen. I heard the following anecdote of one of the bears of Berne from M. De Candolle, in his public lectures at Geneva: "In a very severe winter, when provisions were also scarce, a little Savoyard chimney sweeper, houseless and friendless, was reduced to the extreme of misery; when recollecting the cell of the bear, he resolved to beg that shelter from the beast, which was denied him by man. He climbed down the wall of the trenches, entered the cell, and crept close to his shaggy companion for warmth; the bear received him kindly, and seemed much pleased with his company. During a great part of the winter, the boy paid his nightly visit to his warm-coated friend, who even suffered him to partake of his vegetable diet. The thing was at length discovered; and the humanity of the inhabitants was awakened by the singularity of the circumstance, to provide a more suitable bed for the little chimney-sweeper."

Going from Berne to Thoun, we saw everywhere the land in a good state of cultivation; substantial farm-houses, fine cattle, and stout industrious inhabitants. The women, in the costume of the country, with

full white sleeves, embroidered velvet bodices, and silver chains and ornaments, were tossing the dung about in the fields, and even drawing light carts. When at Thoun, we were prevented by the weather from going to see the view from the church-yard, which is said to be remarkably fine. The next morning we engaged a boat with three men, to row us to the other end of the lake.

The Lake of Thoun is about ten English miles in length, and its average breadth is about two miles; it presents many striking beauties, but the most conspicuous and characteristic object is a perfectly pyramidal mountain, called the *Neissen*, near the middle of the southern side of the lake: its summit is a little below the line of perpetual snow. The entrance of the valley of the Kander, leading to the passage over the Gemmi, is seen below the Neissen. The sandstone, and beds of sand, gravel, and conglomerate, which we had travelled over invariably from Geneva, continued on the northern bank of the lake to near its termination. We were now approaching another series of rocks, and I was desirous, if possible, to ascertain where the new series commenced; but I was too

distant from the shore to land, and our boatmen, who knew every part of the lake, could give me no information, as they could not speak a word of French. Recollecting something of the Yorkshire dialect, I tried how far it would assist me in making myself understood, and I succeeded tolerably well. "*Tat is sandstein?*" was answered with *yaa*, or *nae*, as we rowed along, till it was no longer doubtful that we were beyond the sandstone range. We landed at a little village, called *Neuhaus*, where chars are in waiting to take company to Interlaken. We hired one of them, and passing through the town of *Unterseen*, (originally *Understein*, to designate its situation under the stone or rock which towers above it on the north), we arrived in about half an hour at *Interlaken*, a village deriving its name from its position between the lakes of Thoun and Brientz.

The small plain in which Interlaken is situated, might be denominated the *Cashmere* of Switzerland. It is about three miles in length, and two in breadth; and, where not occupied by meadows and orchards, is cultivated like a garden: it is very populous. This fertile plain is em-

bosomed amid lofty mountains, many of which are covered with fir trees to their summits, and over these tower the snowy heads of the *Jungfrau*, the *Eiger*, and the *Silver Horn*. The Jungfrau is the loftiest mountain, except one, in the whole range of the northern Alps; it rises as high above Interlaken (within 500 feet) as Mont Blanc rises above the valley of Chamouny, and appears more sublime, as it stands on a much smaller base. The scenery round Interlaken is so rich, varied, and majestic, that it leaves nothing for the imagination to supply; and the numerous walks and excursions which can be conveniently taken from thence, render it a most eligible station for those who wish to contemplate, at their leisure, the grandest part of the northern, or Swiss Alps. Interlaken is a favourite place of resort of the inhabitants of Berne in the height of the summer; there are several boarding houses, the terms of which are four francs and a half per day, and a very good inn. The season being far advanced, there was no company at the boarding houses, and we fixed our quarters at the inn. The crowds of travellers who fly through this country in sum-

mer, either to kill time, or merely for the pleasure of saying they had been here, were departed; and the tourists now travelling were, for the most part, true lovers of nature. It was our good fortune to meet with more agreeable and intelligent society at Interlaken, than we had seen in any of our former expeditions.

We remained a month in the *Bernese Oberland*, as the autumn was uncommonly mild. To the delight received from the scenery, was added the satisfaction of observing the neatness, comfort, and enjoyment of the people. I could not compare their situation with that of the Savoyards, without reflecting on the cause whence this difference arose. It certainly is not from the soil, or climate; for in both these respects Savoy has the advantage. The superiority of condition of the Bernese peasantry must be sought in a feeling of independence; an exemption from all oppressive services or taxes, and a just government. If history does not sufficiently convince us, that national misery is the invariable result of a despotic government, we may contemplate the actual condition of the people under the domination of Austria and Na-

ples, or of Tunis or Constantinople, and we shall be fully sensible of this truth. On the other hand, the superiority which England has long enjoyed, and still enjoys, over all despotic European states, is only owing to the superior degree of freedom we possess. With these striking facts before our eyes, it is passing strange that writers are still to be found in Britain, who revile with bitterness nations struggling to be free, and who would make the interests, the happiness, and the unalienable rights of the people, yield to the arbitrary claims of a few imbecile families. I was partly lead into this train of thinking, by the conversation we had frequently at the public table with travellers returning from Italy: the oppressive and atrocious conduct of the Austrians to the people was on every tongue. When the Austrians were on their march to Naples, they displayed all the hesitation and fear of felons about to break into a house; but when treachery had made every thing easy to them, their extravagance of joy knew no bounds. From that moment the combined despots saw themselves independent of Britain, or regarded her only as an humble agent, ready to for-

ward their further attacks on the liberties of Europe; and well might they think so, for we had aided them most essentially in the subjugation of Naples, and had willingly thrown away the opportunity of securing the peace of Europe. At that period, a single, *sincere*, and spirited remonstrance would have kept the Austrians at home. But the evil genius who then directed our councils, was too much infatuated by the smiles of despots, to perceive that the power of England would be diminished by extinguishing the free states on the Continent, who alone would be our sincere friends. As it is, there is not one of the great nations in Europe, except Spain and Portugal, that would not be rejoiced to see Great Britain sunk into the ocean. We are hated for our power, but still more for the freedom of our government. Happily more enlightened councils are about to prevail, and I trust that the government of Britain will soon cease to be hated by the *people* of Europe, if not by the despots who govern them.

From Interlaken we engaged a char to take us to Grindelwald, up the valley of the Lutchenthal. The valley is narrow at

first, and presents on each side precipices of dark limestone, with the strata apparently much contorted, of which I shall afterwards speak. Advancing to Grindelwald, the higher ranges of rock recede, and form a broad bay or basin, surrounded by glaciers and snow-capped mountains. The village of Grindelwald is situated upwards of three thousand feet above the level of the sea, having nearly the same elevation as the priory at Chamouny. The forests are entirely of fir, and the cultivated part of the valley has a dreary appearance. Potatoes are the principal food of the inhabitants; they keep goats, from which they make cheese, which is mostly sold to purchase salt, and articles of indispensable necessity. They have a common right in the forests for fuel, which costs them nothing but the labour of procuring it.

What constitutes the most remarkable character of the Bernese Alps, is the abrupt detached forms of the highest mountains, which may be nearly approached, and are seen at one view from the summit to the very base. The *Wetterhorn*, or *Weatherhorn*, is so called, because it indicates the state of the weather, being frequently in-

volved in clouds. From the region of perpetual snow, it is cut down in one unbroken and nearly perpendicular line, to the valley, forming the most awful precipice I had yet beheld. This mountain seems to rise immediately above Grindelwald. The *Gros Eiger*, another mountain of equal or superior height, is also seen on the other side of the valley, from its summit to its base. These mountains rise about 12,000 or 12,500 English feet above the level of the sea. The near view of mountains of such elevation, without any intervening object to diminish the effect, is indescribably sublime. The two principal glaciers come low down into the valley, and the lower one has a large ice cavern at the bottom, from which a river issues. Though these glaciers are extensive, they are not to be compared in magnificence with those of Chamouny.

A very melancholy accident occurred here a few days before our arrival. A young Lutheran minister from Iverdun, ascended one of the glaciers with a guide. A great chasm particularly arrested his attention; it was about four feet wide, and of unknown depth. He was amusing him-

self with observing the beautiful green colour of the ice, and, from time to time, threw in stones, to hear the sound, as they struck against the sides of the chasm in their descent. Desiring to observe their fall, he fixed the point of a long pole (such as travellers take with them on the glaciers) on the other side of the chasm, and supporting himself by it, he leaned over, to look down, when the point of the pole giving way, he was precipitated headlong into the fissure and lost. The guide returned in a state of stupor, and could scarcely relate the circumstance, as he well knew suspicion would be excited, that he had robbed the young man, and thrown his body into the chasm. An express was sent to Iverdun, and some friends of the deceased immediately came over and offered a considerable reward for the recovery of the body. Some of the guides descended, by means of ropes, to the depth of 130 feet, and one of the gentlemen from Iverdun descended with them. He first discovered the corpse of his friend. The countenance, we were told, had the ruddy appearance of life, but both the thighs, and one arm, were broken, and the

head was much crushed by the fall. As his watch and money were found in his pockets, the guide was exculpated from all blame.

With a Chamouny guide, such an accident would probably not have taken place, as they are remarkably circumspect, and will not suffer travellers to expose themselves to real danger, without remonstrating against it.

From Grindelwald there is a mule-road on the north, leading over a mountain, called the Sheideck, to Meyrengen, in the valley of Hasli. This road lies under the west side of the Wetterhorn and Wellhorn, and presents some astonishing views of those mountains. Another road conducts the traveller over the Wengen Alp, into the valley of Lauterbrun. This passage, sometimes called that of the *Wengen Alp-Scheideik*, is stated to be 6840 feet above the level of the sea. It is a day's journey over; the road is little frequented, and in some parts is trackless without a guide; it is occasionally difficult, and very rough. We were five hours in ascending, including an hour we rested at a cattle shed, in the neighbourhood of a spring, and we were

four hours in descending. The sky was without a cloud, and the air was of a delightful temperature, genial and invigorating. The highest mountains of this Alpine range were immediately above us, on our left, and the dazzling whiteness of the snow, contrasted with the deep azure of the heavens, was too powerful for the eyes long to rest upon. The pines became stunted in their growth as we ascended, and disappeared entirely before we gained the summit of the pass, which is above the zone of trees. The first part of the ascent may be said to be on the side of the Eiger, and is directly under the lofty walls of limestone, that form the middle region of that mountain, below the line of perpetual snow. When we had gained the ascent, the three giants of the Swiss Alps, the *Monk-Eiger,* the *Silver Horn,* and the *Jungfrau,* were only separated from us by a narrow chasm, or valley, nearly a mile in depth, into which the avalanches were falling, in rapid succession, from one or other of these colossal masses. The noise was indescribably deep and awful, reverberating in long and repeated echoes, which might truly be called the music of

the mountains, and was in perfect harmony with the vast sublimity of the scene. To these deep echoes succeeded a solemn silence, till again an appalling crash, from another part of the range, was repeated by louder echoes, responding from mountain to mountain. It would have required no very poetic imagination to have heard amid these sounds the mighty genii of the Alps, holding converse together in an awful language, that spoke of the feebleness of human power, compared with the force and immensity of nature.

All that I had hitherto witnessed in the Alps, sunk in comparison with the scene before me. Nowhere, in that vast range, can the two senses of sight and hearing receive a more powerful combined impression of the sublime; but to experience this fully, certain conditions are required. To the clearness of the atmosphere must be conjoined the proper season, and hour of the day. The latter end of summer, when the sky is clear, every day, between the hours of two and four, the avalanches begin to fall, and are greater and more numerous in proportion to the warmth of the weather.

Few persons who have not visited Alpine countries, have a correct idea of an avalanche. It is not, as frequently described, snow set in motion, and accumulated by rolling, for the noise cannot be produced by snow rolling over snow. An avalanche is a mass of snow, sliding from the upper part of a mountain, and falling over a precipice, and then striking against the base of the mountain, or upon the rocks below. To compare great objects with small, the snow falling from the roof of a house upon the pavement, is an avalanche on a small scale: judge, then, of the effect, when many tons, or hundreds of tons of snow fall from the height of several thousand feet upon the solid ground. The snow on the Alps is much consolidated, being partly changed into ice, by partial thawing and repeated freezing.

The reason why avalanches are so frequent from the western side of the Jungfrau, the Silver Horn, and the Eiger, is, that the snowy summits of these mountains slope down rapidly towards the deep chasm or valley of Trumletenthal, which lies between them and the Wengen Alp; the sides of this chasm are perpendicular, form-

ing precipices many thousand feet deep. When the warmth of the afternoon-sun has thawed a portion of the snow, near the edge of the precipice, large masses fall over it into the valley, and one part giving way, occasions the snow behind to slide down also, and shoot over the rocks in a continued stream. As this process is going on, along a line of five miles in extent, the avalanches often follow each other in rapid succession. The snow near the summits of these mountains is probably more than 300 feet in depth, so that the diminution of it, by avalanches, cannot be perceived.

It may be briefly stated, that a sloping bed of snow, over a precipice, like the roof of a building above a wall, are essential conditions for an avalanche, or, at least, for producing an avalanche which will be attended with those loud and appalling sounds, that break in on the silence of Alpine regions. There may be, and often is a sliding down of snow, from the upper to the lower part of the mountains, without the snow falling over a precipice; but such avalanches can produce but little noise.

It was nearly dark before we descended into the valley of Lauterbrun, though we had seen it immediately below us during a great part of the afternoon. We remained in this beautiful valley nearly a week. The cascade of the Staubach, for which it is most commonly visited, is the least interesting of all the objects it contains; for though it falls in a considerable stream, from the height of 900 feet, the water is broken into drops before it reaches the ground, and is scarcely seen when you are near; but at a distance it looks like a deep column of smoke. *Staubach* signifies the river of dust, and it is not inaptly named.

While here, I visited a mine of argentiferous lead ore, in the upper end of the valley: it is not at present worked. There is a mountain on the west side of the valley, which presents some singular illusions with respect to stratification.—See Appendix.

The valley of Lauterbrun, besides the magnificence of its mountain scenery, is particularly distinguished by the beautiful woods which adorn its sides, and still more by the rich deep verdure of its fields and meadows, that forms a very striking contrast

to the brilliant whiteness of the snow-clad Alps above. From this contrast of the seasons, the Bernese Alps have been called "the summer palaces of the God of Winter."

The landlord of the inn at Lauterbrun, resides there only in the summer months, for the accommodation of tourists; he is regarded as a man of fortune in this part of Switzerland, and both he and his wife are very respectable characters. A circumstance occurred while we were there, which may teach travellers not to be over hasty in abusing the people of the country. An English gentleman, with his niece, drove up to the inn, and alighted, but did not enter, or leave the char in charge to any one, while they proceeded up the valley. After returning from the Staubach, the lady said she had lost a valuable shawl, which was left in the char; on this her uncle began to abuse the people of the inn, calling them *voleurs*, &c. The landlord was gone to Interlaken, but his wife immediately ordered her servants to bring in the gentleman's box-coat and whip, which she said should not be returned until he had given satisfaction before a

magistrate, for the injury done to their character, or would sign a written recantation of what he had said. Learning that an Englishman was in the house, he came to ask my advice: I told him that I had perfect confidence in the honesty of the landlord and his wife, but I thought he would have no difficulty in arranging the affair, without going before the bailiff, as the landlord seemed a sensible good-tempered man. I persuaded the landlady to let the gentleman return to Interlaken, sending with him a confidential servant. They met our host on the road, who, after some explanation, returned the gentleman his box-coat and whip. A few hours afterwards, when we were retiring to bed, the landlady came thundering at the door, with a letter in her hand, which the English gentleman had sent over by express, to say that his niece had found the shawl in her room, at Interlaken.

On our return to Interlaken we waited till the weather was favourable, to make an excursion on the Lake of Brientz, and visit the valley of Hasli. The rocks on the south side of the lake of Brientz, which appear low when seen from the shore, on

account of the very high mountains behind them, have an uncommonly striking appearance when near them, on that side of the lake. They rise abruptly from the surface of the water, without any shore between, and are tinted with a variety of vivid colours, such as I never saw on rocks elsewhere. Some were yellow or green, others purple and red, and they are also most richly fringed with wood, projecting from the cliffs in every direction. Were a painter faithfully to delineate these rocks, the picture would be thought a fairy creation of his sportive fancy, and not a representation of the sober realities of nature. We landed to view the cascade, or rather series of cascades, at the Giesbach, which falls into the Lake of Brientz. This is incomparably the most beautiful of all the cascades in Switzerland that I have visited, the accompanying scenery being more rich and varied. Six very picturesque falls are seen at once. There are seats with tables for the accommodation of parties, who often bring refreshments with them, and pass the day here, and certainly a more enchanting spot can scarcely be found.

In approaching the cascade, we were welcomed with a mountain horn, that awakened the numerous echoes among the rocks. A German schoolmaster of Brientz, whose scholars being at work in the fields, in the summer, is left without employment, has furnished a little cabin upon a rock near the cascade, where he resides with his family, during the season, to attend upon visitors to the cascade, and his daughters sing in parts for their entertainment.

The town of Brientz is situated on the northern side of the lake, nearly opposite the Giesbach. The lake is here about two miles broad; it has much of the character of the upper end of the Lake of Annecy, and is justly admired by all lovers of lake scenery. It was the time of harvest, and "the voice of gladness and of singing was heard in the land," and on the water also, for the lake, in the evening, presented a most animated scene; it was crowded with boats belonging to the peasantry, who were bringing home their crops of fruit and potatoes from the environs, and were singing as they rowed along; a talent for

which the females of Brientz are renowned. There is something extremely gratifying in seeing a whole population thus busily employed in gathering in the fruits of the earth, where each one feels his labour sweetened by the consciousness that he is working for his own family, and upon his own land. Every family possesses a boat —we counted upwards of sixty.

The inhabitants of the valley of Hasli are regarded as a distinct race, being handsomer, and better proportioned than in any other part of Switzerland. Elizabeth, the fair *Batelière* of Brientz, has been more celebrated than Mary of Buttermere: she is married to one of the innkeepers at Grindelwald. I did not see her, but if the engravings that have been taken from her picture are faithful, she would have won the apple, in a contest for beauty, from our lady of the Buttermere lake, whom I remember in the very meridian of her celebrity. Neither of these beauties are happily married.

About a mile beyond Brientz, proceeding towards Meyringen, we saw on the left the remains of a vast éboulement; the valley to a great extent being covered with

stones and earth, which had come down from the mountains behind, in the year 1797, when the villages of Schwanden and Hoffstetten were partly destroyed.

Almost close to the eastern end of the Lake of Brientz, there is a low calcareous mountain, called the Baltenberg, under which the road passes. The mountain presents, at this extremity, one of the most extraordinary cases of bent and contorted stratification that I have any where seen. On my return to Brientz, I devoted a morning to its examination; an outline which I took, and a description of it, will be given in the Appendix.

The valley of Hasli may be about a mile in breadth at the bottom; it is bounded on each side by perpendicular precipices of limestone, over which numerous cascades are constantly falling: in the space of about eight miles, there are no less than eight considerable waterfalls, besides the *Reisenbach*, which is one of the largest cascades in Switzerland, but less beautiful than the Giesbach. Meyryngen is a large Swiss town, and there is here a large and good inn. Above Meyryngen the valley divides, the principal branch leading to

the passage of the Grimsel and St. Gothard. From Meyryngen there is a mule road on the north to the canton of Underwalden and the lake of Lucerne, and on the south, under the Wetterhorn to Grindelwald. Those who would enjoy Alpine scenery in all its grandeur, should go from Meyryngen to Grindelwald, and the following day, from Grindelwald to Lauterbrun over the Wengen Alp. By this route they would save time, as the journey to Meyryngen alone will scarcely reward the labour of the tourist, who is not proceeding farther; the lower valley of Hasli being inferior in beauty or grandeur to many others.

The three valleys of Hasli, Grindelwald, and Lauterbrun, with Interlaken, comprising numerous villages and a considerable population, are cut off from all intercourse with the rest of the world, except by mule paths and by the lakes of Thun and Brientz, which, in stormy seasons, are navigated with difficulty. The manners and costume of a people so entirely insulated, will long remain unchanged; but religious innovations, as strange as those in more frequented parts of Europe, find their proselytes even here. After I left Interlaken, I was

informed that a German sect of Christians, similar to the Adamites, in the early ages of the church, had obtained many adherers in some of the villages on the western end of the lake of Brientz. These enthusiasts are said to be very simple-hearted honest people, blameless in every thing except the extravagance of their religious opinions. They maintain that public worship can only be acceptably performed, when the body is divested of all its garments, which being signs of the existence of sin and shame in the world, and introduced after the fall of man, ought not to be worn, when we more immediately approach the presence of the Deity in prayer. The Bernese government has endeavoured to suppress this sect by the mildest means, but in vain; they still meet secretly. When they are discovered, they are taken to the hospital for insane people, and are treated with much tenderness, and pastors are appointed to convince them of the error of their opinions. I had no opportunity of making enquiry respecting this sect, for I did not hear of it till after I had left Interlaken; but I have no reason to doubt the accuracy of my information. The sect is said to be sta-

tionary in numbers, notwithstanding the efforts of the government to suppress it.

At Brientz, we saw the young men of the country assembled on the Saturday afternoon to learn the use of arms, and on the Sunday following, after divine service, we saw another party at Interlaken at their exercise, firing at a mark across the river. The population of the canton of Berne being all armed, it would not perhaps be possible for the government to exist in opposition to the will of the whole people, but they may control one part of the canton by the aid of the other. A few years since, the inhabitants of the Oberland desired to separate from Berne, with which they have not much connection, and to form a distinct canton governed by their own laws. The Bernese government sent a number of troops from other parts of the canton to Interlaken and Unterstein, but after some time the discontent was appeased without violence. The people have scarcely any cause for complaint against the government, as they pay no taxes, and justice is very impartially administered. As a proof of their confidence in this respect, and also of the honesty of the people, I

was told the following anecdote by a senator of Berne. Two neighbouring farmers had a dispute respecting the right to some adjoining property, which they could not compromise, and an action was brought to determine it. On the day appointed for the trial, one of the farmers having dressed himself in his Sunday's clothes, called upon his opponent to accompany him to the judge, when he found his neighbour at work in his ground, on which he said, "Is it possible that you can have forgotten that our cause is to be decided to-day?" "No," said the other, "I have not forgotten it, but I cannot well spare the time to go; I knew you would be there, and I am sure you are an honest man, and will say nothing but the truth. You will state the case fairly, and justice will be done:" and so it proved, for the farmer who attended stated his neighbour's claims so clearly, that the cause was decided against himself, and he returned to inform his opponent that he had gained the property.

The peasants in this part of Switzerland live chiefly upon cheese, potatoes and dried fruits; but in some situations, cheese alone

forms the principal part of the diet; it gives to the countenance a sallow unhealthy appearance, and produces cutaneous eruptions, like the small-pox.

At Brientz and Interlaken, the peasants were drying their plums in the sun; this fruit abounds here, and a spirituous liquor is made from it; *eau de prunes.* In other parts of Switzerland cherries are the fruit which supplies them with spirits, *eau de cerises*, or *Kercher water.* As there are no vines in this part of Switzerland, nor is barley grown in sufficient quantity for beer, the peasantry (even those who are opulent) have no beverage but water or milk; nor do they keep any wine in the house, but they are in the habit of occasionally taking their wives and families to the nearest inn, where they treat them with the best wine the place affords. Thus they have the advantage of hearing the news, and mixing in society, of which they would otherwise be deprived; for, excepting attending their church on the Sunday and occasional fairs, they have seldom any business to take them from home.

The newspapers published in the Swiss republics contain scarcely any political in-

formation. As the governments of the different cantons are afraid of offending their powerful neighbours, the editors avoid any comments on passing events. Even the Genevese are content with publishing twice a week, a single sheet of advertisements called *Feuille d'Avis*, without any political news whatever.

I have omitted to mention the ruins of the castle of *Unspounnen*, near Interlaken: the ground round it was recently purchased by the widow of General Moreau, who intended to have pulled down the ruins, and to build a mansion in the place; but she was told by the Bernese government, that the castle was regarded as a part of the country itself, being connected with its history, and they would not suffer it to be demolished. This castle will become interesting to the admirers of Lord Byron's poetry, for it must, I conceive, be the imaginary residence of *Manfred*, placed in view of the Jungfrau; and the "*Spirit of the Mist*" was doubtless seen by the poet, fluttering within the iris formed by the spray of the Staubach, in the neighbouring valley of Lauterbrun. The weather was cold and unfavourable when we recrossed the Lake of Thoun on our return to Berne.

CHAP. VI.

BERNE TO FRIBOURG. — SUPERSTITION OF THE FRIBOURGERS. — FRIBOURG TO VEVEY AND BEX. — MEDICAL EFFECTS OF A GRAPE DIET. — THE VALLAIS, OR UPPER VALLEY OF THE RHONE. — GENERAL VIEW OF ITS PHYSICAL GEOGRAPHY. — DANGERS TO WHICH THE INHABITANTS ARE EXPOSED. — EMIGRATIONS. — ZOOLOGY AND RARE MINERALS. — RELIGION. — ANCIENT CUSTOMS. — CONSTITUTION OF THE CANTON. — SION. — BATHS OF LEUK. — BRIEG. — BATHS OF NATERS. — THE SEMPLON ROUTE. — DESCENT INTO ITALY. — LAGGO MAGGORE. — DIFFERENCE BETWEEN THE SOUTHERN AND NORTHERN SIDE OF THE CENTRAL RANGE OF THE ALPS. — RETURN THROUGH SAVOY. — EVIAN. — THONON. — RIPAILLE.

We left Berne at ten in the morning, and arrived at Fribourg, the capital of the canton of that name at two. One by one, the great giants of the northern range of the Alps disappeared from our view, and last of all the Jungfrau, as we entered a more level country, with hills of moderate elevation, composed of sandstone and conglomerate. We had passed through the

northern extremity of the canton of Fribourg, in going from Lausanne to Berne, and had been struck with the difference in the appearance of the houses and inhabitants, from those of the Pays de Vaud. The protestant cantons are almost always characterised by a greater attention to cleanliness and comfort than those which are catholic; but in the part of the canton of Fribourg we were now travelling through, the appearance of the people was respectable, and the land was well cultivated. The men were dressed plainly, with brown coats, and broad-brimmed hats. The costume much resembled that worn by the society of friends; their countenances were serious and intelligent, and had I not known that I was in Switzerland, I should have supposed all the male population were quakers. The young women looked healthy; they had fine clear complexions and round faces, and wore their hair platted and twisted round the head in *rouleaux* of extraordinary size; to increase the bulk, they stuff these *rouleaux* with flax. This head-dress, when worn by the old women, had a very grotesque appearance. The city of Fribourg is truly remarkable for its situation; its

walls inclose as much space as the old city of London, though it contains less than six thousand inhabitants. Part of the city and the great church stand on a high rock of sandstone, the other part is situated in a valley below. Within the walls there are many deep and romantic wooded valleys, as sequestered as the least frequented dales in Derbyshire, and the space that is not occupied by houses, churches, or monasteries, is covered with orchards, fields, and meadows; indeed, Fribourg is wholly unlike any other city that I have seen.

The great number of monasteries and religious institutions in this small metropolis, indicate the extent of priestly power in the canton.

The cathedral is one of the finest Gothic churches in Switzerland. The tower is very lofty. Over the principal entrance is seen a singular exhibition of sculpture, representing the last judgment. There is some force and expression in the figures, but they display the barbarous taste and spirit of the age in which they were executed. Below the figure of Christ on the judgment-seat, a large pair of scales are hung up, and the merits of mankind are

determined by weight, but not singly, for several are weighed together, and a kind-hearted angel is slyly pulling the scale, to make the party appear to be good weight. St. Peter is leading the saints up to Paradise; and on the other side dæmons, in human forms, but with pig's faces, are carrying on their backs baskets full of the wicked, and precipitating them into a pit, while other dæmons are zealously stokeing them down with long forks. The insides of the churches are also filled with emblems of the most gloomy superstition ; and over the city gate, on the road leading to Vevey, there is a large piece of sculpture, in which the figure of an old man, intended to represent God the Father, is dandling on his knee, not the infant Jesus, but Christ upon the crucifix. It is astonishing that such a shocking piece of absurdity and impiety, should be exposed to the public gaze, even in a catholic country, and particularly in one where the minds of men may be supposed to be in some degree enlightened by the possession of political freedom. The gates and the walls are very ancient, their date is evidently prior to the use of fire-arms. The Jesuits have a

large church and convent on one of the heights within the walls, a vast reservoir of water is close by it, to supply the town instantly in case of fire. A few miles from Fribourg there is an establishment of Trappists. In fine, Fribourg may be regarded as the asylum of superstition; nothing is heard early in the morning but the tinkling of bells for matins, and the only persons seen in the streets at that time, are women in long black cloaks going to the confessional or to mass.

There, are, however, several useful institutions here; among others, a large school for boys conducted by the Abbé Girard, who has endeavoured to extract and combine the best parts of the systems of Pestalozzi, Lancaster, and Fellenberg. There is another establishment where girls are employed in the manufacture of coarse cloth, and in knitting, &c. The articles are sold for their benefit. The *sœurs grises* nurse and superintend the sick, in a large hospital near the gate to Lausanne.

The French language is spoken in the upper part of Fribourg, and German in the lower. There are many striking views from the walls.

Fribourg, though little visited, is more interesting than any city in the neighbouring cantons, because it carries the spectator back to a state of society, altogether different from that of modern Europe, and its present inhabitants are in perfect keeping with its antique appearance.

From Fribourg to Bulle the road is good, and the scenery, though not mountainous, is rich and pastoral; but at Bulle we again approach the mountains, and at Gruyere, (two miles beyond Bulle,) celebrated for its cheese, the scenery resembles, on a scale less grand, that round Interlaken. In the bed of the river, I observed limestone dipping to the south-west, at an angle of thirty degrees. In the other parts of our route, both yesterday and to-day, the limestone is everywhere covered by an immense mass of sandstone, and conglomerate, extending from Berne to the lake of Geneva. The descent to Vevey from Bulle is very fine: a deep and beautiful wooded valley lies below the road on the left: through this valley runs the river Veveyse. I observed in this descent beds of sandstone almost vertical, and near these were other

beds much confused. I should regard this as a local slip, as this sand and sandstone must, I think, be considered as of comparatively recent date, lying unconformably over the lower strata.

The preceding year we came to Vevey by Lausanne, between which towns the sides of the hills are covered with vines, arranged in terraces, rising one above the other, from the edge of the lake. The finest grapes in the Pays de Vaud are grown here; they are as large and fine-flavoured as our best hot-house grapes: this arises from their being well sheltered from the northern and easterly winds, by Mount Jorat, behind Lausanne and Vevey, and by the mountains on the north-east end of the lake. The physicians at Geneva send some of their patients here during the vintage, to take what is called a regular course of grapes, that is, to subsist for three weeks entirely on this fruit, without tasting any other food or drink. The quantity recommended to be eaten is, in many instances, about seven English pounds per day. The patients generally dislike the grape diet at first, but in a few days it becomes agreeable, and they feel no inclina-

tion for other food. An English gentleman, who had been at the same *pension* where we boarded at Geneva, was sent to take a course of grapes, near St. Saphorin; he was in a state of great debility, after an attack of the measles, and was declining rapidly; he had eruptions over his body, and his recovery seemed doubtful. After three weeks he returned to Geneva much improved in appearance, and in good health and spirits. In certain cases of insanity, a grape diet is said to be very efficacious in restoring the patient to a sound state; and so far as an entire change of food can effect a material change in the constitution of the patient, it may be readily admitted that subsisting entirely on grapes, for several weeks, may have a powerful influence. The grapes grown here are white; we received a present of a large basket-full, when we went from Lausanne to cross the Semplon, which served us several days, and we thought them the best we tasted on the Continent; but they are certainly not superior to our English grapes from the stove. If a grape diet be found so salutary in certain cases in Switzerland, why might not our physicians find it to be

equally so in England? we have more expensive courses of medicine than eating one hundred weight of grapes, fresh from the stove. There is another medical application of grapes that cannot be introduced into England: in cases of obstinate rheumatism, and for sprains and paralytic affections, physicians order their patients to apply to the limbs the refuse from the wine, while warm from fermentation.

Vevey was not seen with less interest than in the preceding year, indeed the brilliancy of the sky seemed to give an increased charm to the scenery, and we remained here the following day, purposely to enjoy it.

I recollected that Lord Somerville, when on his road to Italy, was arrested by the hand of death at Vevey, and the son of our landlord at *Les Trois Couronnes*, told me that he died at their house, and was buried in the ground adjoining the church. Having been honoured with several kind attentions from his lordship, I could not resist the impulse to visit his grave, and pay a silent tribute of respect to his memory. The *cimetière*, like all the other cimetières or burial grounds in Switzerland, was walled in and extremely neat, the

graves being ornamented with rose-trees and flowering shrubs. Over the gate was the motto: *Fils des hommes retournés.* I sought in vain for the grave of Lord Somerville, nor could the wife of the *concierge* inform me where it was. I entered the church, but my search was here also fruitless. While looking round, the monument of Ludlow, erected by his wife, caught my eye. I observed by the date of his death, that he survived the revolution of 1688 a few years, and might, therefore, have safely returned to England, but he had then been long domesticated at Vevey, and perhaps he might fear future changes in his own country. On returning to the inn, I learned that though Lord Somerville was buried at Vevey, his corpse had been since disinterred and removed to England. The cimetière of Vevey is, I think, the last place from which we could wish our earthly remains, or those of our friends, to be removed, so long as any regard is preserved by sympathy or association for the habitation of the dead.

We visited the museum of Dr. Lavade, who obligingly showed us his different natural curiosities, and works of art. He has

one of the most perfect crystals of Adularia, perhaps, in Europe, equally remarkable for its vast size, its transparency, and the regularity of its form. Among the portraits is that of the unfortunate negro chief, Touissant, who died at Vevey. The seizure and removal of Touissant, is one of the deepest stains in the history of Napoleon, and it was as impolitic and ruinous to the interests of France, and of St. Domingo, as it was flagrantly unjust; but it does not appear that Touissant was kept in the painful state of durance that has been generally believed.

From Vevey we proceeded to Bex, by the same route we had passed the preceding year, through Clarens, and under Montreux. The latter village is situated considerably above the lake, and the view from hence is regarded by many persons as the richest and most beautiful in all Switzerland. The *Dent de Jaman*, a remarkable peak of limestone, rises behind Montreux; from this peak there is a most magnificent view over the lake of Geneva, the Pays de Vaud, and Savoy.

Ville Neuve, a large village, at the head of the lake, presents nothing to interest

the traveller. While our voiturier was resting his horses, I observed a singular instance of sagacity in some ducks that were collected near the carriage. On our throwing out pieces of hard biscuit, which were too large for them to swallow whole, they made many efforts to break them with their beaks; failing in this, the younger ones gave up the spoil, but some of the older ducks carried pieces of the biscuit to a pool of standing water, and held them to soak, till sufficiently soft to be broken and swallowed with great facility. I must leave it to metaphysicians to determine, whether this process was the result of induction or instinct.

Bex is a large village, under the mountains, on the north side of the Rhône. The hills in its immediate vicinity are most richly adorned with wood, and afford a great variety of picturesque views to the artist. On the opposite side of the valley, a pyramidal mountain, called the *Dent du Midi*, rises most majestically, to the height of eight thousand feet above the river; and at some distance behind Bex, is the *Dent de Morcles*, a mountain nearly equal in height, and similar in form. Farther north is the terrific range of the *Diablerets*, which

separate the Pays de Vaud from the Vallais. From one part of this range, called the *Chute de Diablerets*, there were two extensive and fatal eboulements in the last century; one of the peaks falling in the year 1714, and another in 1749; a great number of peasants and cattle were destroyed. A variety of interesting Alpine excursions may be taken from Bex, and there is a very good inn here.

The mountains near Bex abound in gypsum, which is intermixed with rock salt, and there are also salt springs. The process of evaporation, by faggots, already described, Vol. I. Chap. VII. was first invented at Bex. There is a considerable establishment for the manufacture of salt, about a mile from the town, but the evaporating houses are not on so extensive a scale as at Moutiers. A large portion of the salt made here is procured from a solution of the rock salt, disseminated in the gypsum, with which the water can be saturated, before it goes to the boiler. The galleries cut in the rock (which may more properly be called salt mines) are very extensive, and can be visited without difficulty. The reservoirs for the salt water are also exca-

vated in the rock. The gypsum here is of two kinds, anhydrous and common; but I must refer to the appendix for an account of the geology of this district. My principal object in visiting Bex a second time, was to see M. Charpentier, the superintendant of the mines, and well known for several valuable geological papers, but he was unfortunately absent.

I shall here introduce some observations on the Canton of the Vallais, which we passed through the preceding year after leaving Bex.

This canton comprises the whole of the valley of the Upper Rhone, from the source of that river, at La Fourche, to its entrance into the Lake of Geneva, with the exception of a small portion of the northern bank of the river below St. Maurice, which belongs to the Pays de Vaud. La Fourche may be regarded as the western termination of St. Gothard, and is sometimes called the Glacier of the Rhône. The upper valley of the Rhône is upwards of one hundred English miles in length; the flat part of the bottom of the valley is often less than two miles in breadth, but the breadth of the Canton, taken from the

summits of the two ranges of mountains, which bound it on the north and south, is, on the average, more than twenty miles. At the upper end of the valley these two ranges meet and unite.

The direction of the river Rhône, from its source to Martigny, a distance of about seventy miles, is south westerly, when it turns suddenly at right angles to its former course, and runs in a north westerly direction to the Lake of Geneva, which it enters below Port Vallais.*

Before the French revolution, the Canton of the Vallais was divided into the *Haut Vallais* and the *Bas Vallais.* The part of the valley, from below Sion to St. Gingolph, was called the Bas Vallais, and that above the Haut Vallais. Sixteen lateral valleys, some of considerable extent, open into the main valley of the Rhône, and where they unite the width of the flat part of the valley is increased. Thirteen of these lateral valleys are inhabited.

* The Bas Vallais was conquered from Savoy by the inhabitants of the Haut Vallais, and the inhabitants were treated as subjects till the French revolution, when they were emáncipated. In the Bas Vallais, French is the prevailing language, but above Sion, German is most commonly spoken.

The mountains on each side of this valley are the highest of any on the Old Continent, except the Hemmeleh in Asia, for on one side are the loftiest summits in the southern range of the Alps, and on the other, the loftiest summits of the northern range. They form two walls of rock, much shattered and intersected, and varying in height, from nine to twelve thousand feet above the valley. The central mass on each side is granitic, divided into beds which are nearly vertical, and their general range is N. E. and S. W. or nearly in the direction of the valley. The bottom of these mountains in the valley are generally covered with secondary strata, except near its upper part, and also for a short space in its lower part near Martigny, where a deep section is made through the secondary strata, and has laid bare the granitic rocks. From each of the ranges on the right and left, numerous deep ravines, besides the lateral valleys, open into the great valley, and bring their tributary streams to the Rhône. The valley of the Upper Rhône may be regarded as a trough, one hundred miles in length, a mile and a half in depth, and two miles wide at the bottom. The

sides of this trough are deeply furrowed, and split into irregular forms, rising higher and higher behind each other, from the Rhône to the summit of the range on each side. This trough forms the whole canton of the Vallais: its upper part is nearly surrounded by snow and glaciers, and a considerable portion of the intermediate space is covered by barren rocks, forests, and eboulements; added to this, the broader part of the bottom of the valley is, in many places, a marsh. Vast eboulements are every year falling from the enormous precipices that overhang the lower ground; many of these are recorded which have destroyed entire villages. Avalanches have also sometimes fallen of such vast size as to occasion dreadful inundations of the Rhône; and on the 18th of February, 1720, the village of Obergestelen, with eighty-eight of its inhabitants, were overwhelmed by an avalanche. Accidents of a similar kind, but less extensive, are of common occurrence. Lakes of water which have been dammed in by the extension of the glaciers across the mountain-valleys, are sometimes suddenly poured into the lower valleys, by the breaking up of the ice. The

velocity these waters acquire in their descent, and the great quantity of earth and stones they carry with them, render their force irresistible. The water is seen approaching like a moving wall, bearing down every thing opposed to its progress. In this manner Martigny has been several times nearly destroyed, and in the year 1818 it experienced a similar calamity. The valley of the Rhône has frequently suffered severely from earthquakes, as already mentioned, Vol. I. Chap. IX.

In such a situation as the Vallais, man seems to be placed amid the ruins of nature, in a state of warfare with the elements, and he is compelled to be incessantly on his guard against the powers that threaten his destruction. It is this constant exposure to dangers too mighty for human strength to resist, which is supposed to give to the aged Vallaisiens an air of uncommon seriousness and melancholy, — a melancholy which even travellers must in some degree partake, in passing through this canton, notwithstanding the grand objects that it frequently presents to the view, and the picturesque appearance of the villages and churches on the heights.

The air at the bottom of the valleys is often hot and suffocating, when the cold is severe upon the mountains. From various causes, but principally from the stagnation of air in the valleys, from the mineral impregnation of the water, and from want of cleanliness and wholesome diet, cretinism in its most horrid forms, is more prevalent in this canton than in any other part of the Alps. The places most subject to cretinism are where the lateral valleys enter the valley of the Rhône, and the torrents are most charged with minute particles of mineral substances, and also where the air is most stagnant. It is observed that in the villages that are situated about 3800 feet above the level of the sea, the inhabitants are not affected with this malady. Intermittent fevers are also frequent in the marshy parts of the valley, and the inhabitants are affected with cutaneous disorders, from living on cheese and salted meat: indeed the general appearance of the peasantry is indicative of poverty and misery.

The canton of the Vallais was the first part of Switzerland that we travelled leisurely through, in the year 1820.

It was then the vintage, but instead of the happiness and cheerfulness which description had led me to anticipate, and which I afterwards saw in some of the other cantons, I was every where shocked with the sight of a wretched population. The Vallaisienne damsels returning home in the evening with their little flocks, formed pleasing groups at a distance, but these shepherdesses of the Alps bore no more resemblance to *les bergères des Àlpes* of the poets, than the Hottentot Venus to the Venus de Medicis.

Though nature appears to have dealt unkindly with the Vallaisiens, they suffer much less from natural than from moral evils, or rather the former are greatly increased by the latter. Superstition, ignorance, and indolence deprive them of the comforts and security which an enlightened industry might procure. For instance, the valley might be rendered far more healthy and productive by draining. This, I am persuaded, could be effected without a great expense, principally by blasting the rocks, and opening the channel of the Rhône in certain parts where it is confined; and by giving a freer passage

through the sand-banks and debris on its side, by which its course is impeded during floods. The government should undertake the management of this, and not trust to the proprietors or the communes through whose land the river flows. In the choice of situations for building villages and cottages, care should be taken to avoid stagnant air, and places exposed to eboulements or sudden torrents; but instead of this, after an accident from either of these causes, its probable recurrence seems to be forgotten, as they generally rebuild their houses on the same spot.

Many parts of this valley are extremely fertile, and the warmth is sufficient to favour the growth of the vegetable productions of more southern latitudes. Round Sion and Sierre fig-trees, almond-trees, pomegranates, and mulberry-trees flourish abundantly, and the grapes are rich in flavour.

In the management of their vines the Vallaisiens are both slovenly and unskilful. No rich patriotic inhabitant has attempted to introduce improvements suited to the soil and climate; but one of the greatest of all improvements would be cleanliness

in their houses. In the mountain-valleys and elevated plains the inhabitants are more industrious, and the husbandry is much better than by the sides of the Rhône. In 1816 the whole population of this canton amounted only to 62,909: there cannot be a doubt, that with proper management it would support a much larger number of inhabitants; in fact, they are absolutely wanted for the proper cultivation of the soil; yet shortly after the above census was taken, two hundred of the inhabitants of this canton emigrated to the Brazils, to better their condition. A friend of mine saw them depart from the confines of the Vallais, where they were followed by their friends, and the bishop of Sion, who came to give them his farewell blessing. It was a truly affecting spectacle. How much better would it have been for the canton, had these wanderers been persuaded to remain at home, and improve their own country; but there is a great want of public spirit and community of interest and feeling among the Vallaisiens in different parts of the canton. Before I left Switzerland I heard that the Vallaisien emigrants were in great distress;

a subscription was opened for their relief.

The vegetable productions of this canton comprise those which grow between the latitudes of Marseilles and of Greenland. On the rocks facing the south, the thermometer is said to be frequently at 48° Reaumur, or 140° Fahrenheit, while on the heights above are growing the lichens of the arctic circle. Its zoology is rich and varied, comprising several animals seldom found in the other parts of the Swiss Alps. The lynx infests the valleys of Conches, of Viege, of Bagnes, and of Herens. The lämmergeyer has its nest in the inaccessible rocks above Conches, Brieg, and Viege. There is also abundance of excellent game. Trout of amazing size are caught in the Rhone, as far as Sion. Our landlord at la Croix Blanche, at Sion, brought in a trout, to show us, weighing eighteen pounds, which had been caught that morning: they are sometimes nearly twice that weight. The deep intersections made in the central range of the Alps, by the gorges and lateral valleys, have disclosed a great variety of mineral substances, some of which are rare: but many of these val-

leys have never been explored by the naturalist or mineralogist. Among the more rare minerals are

The red sapphir, *Corindon Hyalin rouge*,............	From the valleys of Binn and of Griess.
Green Tourmaline.........	Valley of Binn.
Sphene, *Titane Siliceo calcairé*, ...	Glaciers of the Rhone.
Diopside, Pyroxene comprimé,.....................	Valleys of Saas and D'Annivers.
Vesuvian green and brown,	Ditto.
Diallage, Smaragdite,......	Ditto.

Mines of cobalt (tin, white cobalt, and arsenic of cobalt) have been worked in different parts of the valley; also mines of lead and silver. Gold is obtained but in small quantities near the village of Semplon. Want of enterprise, of intelligence, and of capital, are probably the reasons why the mineral treasures of this canton are not more explored.

The religion of the canton is exclusively catholic, under the spiritual government of the bishop of Sion, who has a certain influence in the temporal government, his vote counting for four in the senate or diet of the canton. The bishop of Sion was formerly a person of much

importance, being a prince of the empire: he levied troops, formed alliances, and frequently waged war against his flock, during the struggle of the Vallaisiens for independence. At present his revenues are about 20,000 francs. We visited his palace at Sion, a gloomy and ancient edifice. On a vacancy, a chapter of twelve canons nominate four persons to the bishoprick, from which number the bishop is elected in the diet of the canton, by a majority of votes.

The jesuits have two large establishments in the canton, one at Sion, the other at Briegg. At the latter place, we were informed they had 200 pupils; their lectures are given in the German language, which is that of the Upper Vallais. This restless body of ecclesiastics, ever seeking temporal influence, has been, at several different times, expelled from Sion. In 1627 the jesuits were entirely driven out of the canton, but they have been permitted to return; yet, recently, they again nearly incurred the risk of expulsion, for opposing a commission appointed by the government to superintend public education: they opposed this commission, on the ground

that the laity had no power to meddle with the church. We could not avoid observing the simplicity and superior taste with which the insides of the jesuits' churches are decorated, when compared with the tawdry ornaments of the other churches in the canton. There are some fine paintings in these churches of the death and beatification of Loyola, the founder of the order of jesuits.

The Reformation, soon after its commencement, made considerable progress in the Vallais, and some of the magistrates and nobles embraced the reformed faith. This, for many years, occasioned a great struggle between the partizans of the two religions, till, in 1603, it was decided by vote in a general assembly of the citizens, held in the open air, that the Romish religion should be maintained, and the protestants were ordered either to retract their opinions, or to leave the canton: time being allowed them to dispose of their property. At the same period, the Vallaisiens were prohibited from sending their children to the protestant colleges in the other cantons. This has been a great calamity to the canton, for the little information that is pos-

sessed being confined to the Catholic clergy, has given them great influence, which they seem desirous of preserving, by keeping the people in ignorance. There is not a single public library in the canton. The clergy, though poor, thrive amid this ignorance; for I observed them every where "*gros, gras, et bien portant.*" In democratic cantons, where the people are uninformed, the priests being unawed by the superior power of kings or nobles, will always have a preponderating influence, particularly if they possess or pretend to possess the privilege of selling the favour of heaven. I had this observation pressed on my attention when we entered one of the churches in Sion to see the altar-piece. The church door was closed, which is unusual in catholic churches, but on touching the latch it opened, and we saw a priest occupied in giving absolution to a man who was kneeling before him with his hands closed and uplifted. The priest repeated the Latin service with much energy and gesticulation, and from time to time he gave the poor wretch a dash of holy water from the lustral broom which he held in his hand. I did not approach sufficiently near, to observe whether

the penitent grew whiter after each lustration, as his peccant stains were washing out. Our conductress, a girl from the inn, informed us that the man had committed some petty theft. We should not have remained in the church, as it was a secret service, had not the girl hinted that our being there would not give offence.

The Vallaisiens are said to be extremely superstitious, and to trust much to supernatural power for the remedy of evils, that require only prudence or industry to avoid. It was customary to exorcise the maladies of the sick, or even a rock that was in danger of falling, or any natural calamity, by which they were menaced. They retain some fêtes and processions of pagan origin, which the church does not approve. Formerly a singular species of ostracism was enforced in this canton, when it was intended to drive away any powerful and obnoxious member of the state. A large club was provided, the end of which was rudely carved into the shape of a man's head, the supposed representation of the obnoxious party. Every one who wished his expulsion drove a nail into this club, and when the number of nails was supposed to be sufficiently great, this emblem was

carried in procession before the house of the offender, who was summoned to justify his conduct; but he was always condemned without being heard in his defence, and ordered to emigrate in a certain time. If he refused to obey the sentence, his house was attacked and pillaged. This process of *club-law* has been long obsolete.

I have often reflected on the misery that exists in this canton, compared with the Oberland of Berne, which is only divided from it by the same range of mountains, and is less fertile. I am inclined to attribute the misery of the Vallaisiens chiefly to the circumstance of the land belonging to a few great proprietors, who let it to the peasantry, and they being merely tenants, feel but little interest in its improvement. We were told at Briegg of one proprietor who owned the principal part of the land in the valley of the Rhône, from that place to Leuk; the baths of Leuk were also his property. I omitted to inquire into the division of property in the other districts of this canton, but I think I was informed that the citizens of Sion possess a great part of the land in the upper Vallais. In situations of difficult access, and exposed

to calamities unknown in more level countries, the possession of the soil seems required to give that charm to labour which can excite to activity and enterprise; or it is at least required, that the proprietors of the soil should be both intelligent and humane, and endeavour to ameliorate the condition of their tenantry, by liberally encouraging such improvements as may ultimately be beneficial to both parties.

Lord Orford says of Holland, that it would be a charming country if we could only change the soil, the climate, and the people. Perhaps many persons who travel through the Vallais· might deem a similar change necessary for its improvement. I am, however, persuaded, that the diffusion of knowledge and sound principles would make the Vallaisiens rich and happy, compared with their present condition.

The canton is divided into thirteen districts, improperly called dixanes or tenths. The dixanes are divided into communes. Each of the dixanes has its council, and sends to the diet of the canton four members, who remain in power two years, but are re-eligible at the end of that time.. The members of the diet elect a bailiff, and five other

officers, who form the council of state or executive power. They may be elected either from the members of the diet or from other citizens who are qualified; but it is limited that three of the council shall be chosen from the Haut Vallais, and two from the Bas Vallais. The bailiff and council are in communication with the members of the Helvetic confederacy on all subjects relating to the general interests of Switzerland. The government is a representative democracy, but the advantages of a representative system are in a considerable degree weakened, by nullifying the legislative power of the members of the diet, for no law can be passed till it has been referred to the councils of the separate dixanes, and approved by the majority. In some cases, as those of taxation, the laws must not only be referred to the dixanes, but to the communes or parishes also. Thus local interests are opposed to each other, and are more regarded than the general interest of the whole. In one of the dixanes, that of Sion, the internal government is purely aristocratic, the council consists of twenty-four members, who are elected for life, and chosen by themselves, when there is a va-

cancy, from among those citizens who have exercised the office of syndic. The number of burghers or citizens in this dixane does not exceed one hundred and twenty, though it is the most opulent and populous of the whole canton. The other dixanes are democratic. The present constitution of the Vallais was adopted in 1815.

The Vallais, though wanting men for the proper cultivation of its soil, yet, like many of the other cantons of Switzerland, still submits to a disgraceful traffic in human flesh, by agreeing to furnish a certain number of mercenary troops to any government that will pay for them. The Vallais supplies the French government with 1000 men.

Sion, *the Sedunum* of the Romans, is the seat of the government, and of the bishop. This city has a striking appearance at a distance, being commanded by two very lofty precipitous rocks, crowned with ancient castles. The city is inclosed by a wall, which has six gates, and is surmounted by numerous antique towers.

The interior of the city is more modern, as it has been several times nearly destroyed by inundations of the river Sienne, which traverses it, and also by fires. Sion was

taken by assault in 1798, by the French. From the hill on which stands the castle of Valerius, we had an uninterrupted view of the valley of the Rhône to Martigny, which appears like the bed of a lake, and seems entirely closed in; for below Martigny the valley turns suddenly at a right angle, and its further course is entirely concealed. The side of a mountain, on the south of Sion, slopes gradually to the valley of the Rhône, and is covered with the country houses of the citizens, who reside there in the summer months, the city being intolerably hot.

Sierre, about eleven miles beyond Sion, is situated in the most picturesque part of the valley of the Rhône, but we found it an uncomfortable place to sleep at. Between Sion and Sierre, we passed under some very precipitous calcareous rocks, that overhang the road, from whence there had been a great eboulement in the year 1798. It took place precisely at the time that a division of the French army was passing by. A regiment of cavalry had just advanced beyond the rocks, and another was very nearly under them, when one of the officers saw a part of the mountain begin to

move, and he loudly cried out *Halte!* He had scarcely spoken, when many thousand tons of stone fell across the road into the plain, but not one of his men was hurt.

Soon after leaving Sierre, we saw the town of *Leuk*, or *Loesh*, upon the north side of the Rhone, at the entrance of one of the most terrific gorges in the whole valley. Near the farther end of this gorge the baths of Leuk are situated, and the wooden houses for the reception of company. There are no less than twelve springs of hot water, varying from 116° to 142° Fahrenheit. The mineral substances hitherto found in them are chiefly the sulphat and carbonate of lime, with carbonate of iron, of which there are nine grains in a pound of water, and one grain of muriate of soda, and one grain of carbonate of magnesia. The gazeous products are but small; they consist of carbonic acid gas and hydrogen gas. The water is without flavour or odour. There are three baths for the company, and one for the poor; each bath is covered, and has seats and chairs within it, capable of accommodating twenty persons. Both sexes bathe together, and remain seated in the bath from one to eight hours, with

tables before them, to play at chess or other games. The baths of Leuk are chiefly used in cases of rheumatism, or cutaneous disorders, and also for gun-shot wounds, which have not been thoroughly healed, which these waters cause to re-open. The season for bathing begins at the end of June, and closes early in September. These baths are much resorted to by invalids, from different parts of Europe.

At *Turtemagne*, which is a short stage from Sierre, there is a tolerably good inn, *la Poste*, at which we slept on our return. About four miles beyond Turtemagne, we passed the village or town of *Visp*, at the end of the valley of that name. The upper part of the valley is called *Saassen-thal*, or *Saas*: it extends to the foot of Mount Rosa. From Visp there is a view up the valley, of that magnificent mountain. No where on the Semplon route, or in the valley of the Rhône, can Mount Rosa be seen to advantage, but from Visp. We ascended to the church-yard, thinking to have a more extended view of the lower part of the mountain: though its distance from Visp is about eighteen or twenty miles, it towered over all intervening objects, rearing its snowy

summit into the dark blue sky to such an amazing height that it almost seems to impend over the spectator. The valley of Saas abounds with minerals, some of which are rare, and here are found *in situ* rocks of *saussurite*, exactly similar to the blocks of that mineral, which are scattered over many parts of the vicinity of the Lake of Geneva. For this information I am indebted to M. A. De Luc, who showed me several specimens from the rocks in the valley of Saas, which we compared with the fragments found near Geneva.

Briegg has a singular appearance: its churches and colleges are in a style of architecture unlike that of any other in Europe, except at Moscow. Ebel says the houses are covered with brilliant silver mica slate, but so far from this being the case, the roofs of all the buildings, except the churches, are covered with a coarse dark slate, nearly as black as soot. It is true the great globes and domes, which surmount the churches, are covered with tin, but this is the covering of almost all the churches and public buildings in Switzerland and Savoy. I feel much inclined to

believe, that M. Ebel travelled through the southern part of Switzerland in his closet.

Briegg was formerly a town of considerable consequence, and there are several very large mansions, with grated windows, lofty and gloomy, like prisons. The place is now so much on the decline, that owing to the poverty of the inhabitants, many of these mansions are entirely shut up; in others the old proprietors reside on the wreck of their little property, but they are only able to occupy two or three rooms, and many of them cannot even afford to keep a servant.

I have before mentioned that the Jesuits have a large establishment here. Briegg appears to have been their favourite abode, when they were driven from other parts of the canton. The village of Naters, on the opposite side of the valley, has a pleasing appearance at a distance, but on entering it, we found every thing miserable and dirty, except the house of the curé and the church.

The valley of the Rhone, above Briegg, becomes narrower, and extends about twelve miles farther to the glacier of the Rhône. The general appearance of the country round Briegg is desolate. Our landlord, in

comparing it to that of Domo d'Ossola, on the Italian side of the Alps, where his brother-in-law kept an hotel, became quite poetical for an innkeeper, exclaiming, "*Oh, la belle Italie! c'est le pays des dieux.*"

We walked down the valley of the Rhone, on the other side of the river, about three miles nearer to Leuk, to see the warm spring of Naters, which rises at the foot of the mountains that form the northern boundary of the valley; it fills an aperture in a natural cavern, which serves as a bath. The rock above the spring is mica slate. I found the temperature of the bath 86°, but I could not try the spring itself. The German physician, who accompanied us to the bath, said its temperature was much higher in dry seasons. Bubbles of gas were rising from the water, which had the odour of sulphurretted hydrogen. There is a small wooden house or shed, built for the use of the bathers, but the patients are generally carried on sledges from Briegg, where they reside during the season. From the nature of the accommodations, I should suppose that the waters are principally used by persons who cannot afford to go to the baths of Leuk. As both baths belong to the

same proprietor, he has no inducement to encourage the baths of Naters. I have made some observations on these waters, and on those of Leuk, Vol. I. Chap. IX. The source at Naters is not very abundant, but probably were passages opened in the rock, the water might be procured in greater quantity, and at a higher temperature. I have before mentioned that the country, from Briegg to Leuk, has been frequently agitated by earthquakes, and we were told that the rock above the bath of Naters opened at the time of the earthquake at Lisbon, and threw out hot water. Before arriving at the baths of Naters, we passed an ancient stone wall, of a rude style of architecture, which extended across the valley of the Rhone. Its present height is not more than seven feet, but it is flanked with towers, and was evidently intended as a fortification. It is said to have been built to stop the passage of the Romans, but it is more probable that it was raised to prevent the incursions of savage tribes from the upper end of the valley. The period at which it was built is unknown. The old Swiss geographers call this wall *Murus Vibericus*.

The German physician at Briegg told us that the cretins are not so numerous as before the occupation of the country by the French. Many tales are related of the French having destroyed a great number of them, on the plea, that they were useless to themselves and to society. One fact is certain, that the French would not permit any persons affected with cretinism to marry, a regulation which was certainly wise and humane.

October 13. 1820, we left Briegg, at nine o'clock, to ascend the Semplon, taking two additional horses to the chariot we had hired at Lausanne. The morning was very fine, without a single cloud in the horison. About twelve o'clock the horses rested one hour, at an inn by the road side, and we did not reach the barrier, near the summit till half past three. Full five hours after we had left Briegg, a turn in the road presented it again below us, and so near that we could distinguish the houses very plainly. The old road up the Semplon is carried along a ravine, on the right, below the present road; and I believe a stout man would ascend the old road on foot in half the time required for a carriage to ascend

the new road. The highest part of the new road is 6560 English feet above the level of the sea. This route has been already so frequently described by others, that I shall merely notice one or two circumstances which have been omitted, or misstated, by preceding travellers. Among these it is truly remarkable, that the most striking object which is seen in ascending the Semplon has not hitherto been noticed, that I know of, by any tourist: this is the view of the southern side of the Swiss range of Alps, that divide the Vallais from the canton of Berne. Every one who has been at Berne knows the conspicuous figure these mountains make from thence, but on ascending the Semplon, you are almost four times nearer them than at Berne, and all the most lofty summits of the Swiss range, with a host of snowy pinnacles on this side of them, and the glaciers from whence they rise, are immediately before the eye of the traveller, if he will turn back to look at them: a more sublime spectacle cannot be imagined. It is true that these mountains are seen under very different forms from what they present on the northern side, and their bases are hidden by the

nearer mountains of the Vallais; but the attentive observer, accustomed to mountain scenery, cannot mistake them. One reason why these mountains have not been mentioned by former travellers, must be, that they have not known what they were. The writer of the *Atlas Portatif de l'Oberland Bernois*, says it is denied by Osdeswald and others, that the Alps of the Bernese Oberland can be seen from the Semplon road; but he does not assent to this opinion. It seems strange, that with any knowledge of the geography of the Alps, a doubt on this subject can be entertained. By measuring the distance on a good map, from the ascent of the Semplon to some of the highest summits of the Swiss range, it will be seen, that it is not much more than fifteen miles, a distance which seems trifling, when speaking of mountains that have more than two miles of perpendicular elevation above the eye of the spectator. An English writer says, that Mont Blanc may be seen from the Semplon road; this is a mistake; but there is a snowy mountain which bears some resemblance in shape to Mont Blanc, seen in the direction of the Gemmi.

After reaching the Barrière we dismissed

our extra horses, and the road soon began to descend along a barren, swampy, mountain-plain. The road up the Semplon, and along its summit, is surmounted by mountains that rise much above it; some of them are covered with perpetual snow. Near the top of the road is a large unfinished building, intended for an hospice, by Napoleon; and below the road, on a part which was the old route, there is a small hospice, where two of the monks of St. Bernard reside all the year to succour travellers.

We passed several scattered cottages, with gardens, orchards, and pastures, before arriving at the village of Semplon. This village, though 1700 feet below the highest part of the road, is one of the highest large villages in Europe, being 4836 English feet above the level of the sea. It was entirely destroyed by the fall of a mountain, on the 31st of August, 1597, which killed eighty-one persons. The inn at the Semplon is kept by a Frenchman and his family, who perform all the different functions of cook, waiter, hostler, and chambermaid among themselves. The master,

who is the cook, is not seen by the company. Considering the distance from which the provisions are brought, the accommodations at this inn are good, and the family are attentive and obliging. On the south of the village there is a commune, containing about thirty persons, principally miners, who live in a deep ravine, and wash the sands of the rivulet to obtain particles of gold: there is also a mine which yields a small quantity of that metal. The descent from the Semplon, on the Italian side, is far grander and more striking than that on the side of the Vallais. Precipices of granite, of amazing height, hang immediately over the road, and dark profound chasms open beneath it, on the right, through which the torrents are roaring and foaming, and rushing on to the plains of Italy.

A few miles after leaving the Semplon, the river Diverdo becomes a mighty stream, and runs along a deep valley to the right of the road. The mountains above it are clothed with forests of fir: the trunks of many thousand trees were scattered on its banks, which had been cut down during the summer, and projected into the valley, to sup-

ply the villages and towns below with timber and fuel.

On our return we saw these trees in motion. Thirty-six hours of heavy rain had so swelled the river, that it filled the lower part of the valley, floating the timber on its sides, and hurrying it down from precipice to precipice, with a roar like that of continued thunder, occasioned by the trunks of such a multitude of trees, striking against the rocks in their descent. A long cloud hung midway across the opposite mountain, and a torrent descending from its summit appeared like a white line; but after it had passed through the cloud, and re-appeared below, we saw that it was a great cataract, throwing its waters into the Diverdo. The timber which was floating down the river is stopped at certain stations below, and taken out for sale.

The Semplon road is forty-two miles in length from Gliss to Domo d'Ossola, and about nine yards wide; it is every where as safe and commodious as the roads round London. A mail coach would cross it in six hours. The ascent is nowhere more than one foot in twenty-nine feet. There are ten houses of refuge built by

the road side, to afford shelter to travellers, in case of sudden storms. Twenty-two bridges are thrown over the ravines and torrents, and ten galleries are pierced through the rocks. The largest gallery, that of Gondo, is 157 yards long. This road cost the French government twelve million livres, or about four hundred and eighty thousand pounds sterling. Had such an undertaking been completed in England, at the public expense, under the provident care of commissioners and contractors, it would have cost the nation ten millions sterling; if we may estimate the amount, by a comparison with that generally expended on our public works.

The view of the rich valley of D'Ocella, in descending into Italy, is inconceivably fine. Such is the extraordinary fertility of the soil, that the earth seems over-burthened with produce: the scene forms a most striking contrast to the sterile grandeur of the overhanging rocks in the defiles of the Semplon. The change of climate, too, is almost like enchantment; for you descend in a few hours from the vegetation of Lapland, to a country abounding with vines, figs, and pomegranates; nor

can the traveller see for the first time, without deep emotion, a land rendered interesting to him by so many early associations with history and poetry.

We arrived at Domo d'Ossola early in the afternoon, and while the dinner was preparing, we walked towards a beautifully wooded hill, called Mont Calvary, on which there is a large monastery. The road ascends by a broad zig-zag shady path. We had not proceeded far when we passed a low building, about fifty feet in length, with grated windows, and an open iron grating in the door. On looking through, I was surprised to see a numerous group of figures, as large as life, standing on the floor. It was the first scene of the Crucifixion, representing Christ bearing the cross: the figures were modelled and coloured after the paintings of the best masters, and had a very impressive effect. The mild resignation and deep suffering displayed in the countenance of Christ, were most strongly contrasted with the savage joy and malignant smile of one of the executioners, who was pulling him to the cross with a rope. The centurion was on horseback, in the attitude of giving orders, and

all the characters were grouped in a spirited manner, and brought the scene so forcibly to the mind, that it was impossible to look at it with indifference. The Catholics say, that such representations serve as books to people who cannot read; and it must be granted, that they are more likely to impress the minds of those who are little accustomed to reflection, with the truth of any past event, than a mere verbal description. Gilpin says, that "coloured statues do not affect the mind so strongly as plain marble; by approaching nearer to life, they resemble death." This may be true with single figures; but where a number are grouped together, in natural and spirited attitudes, the first impression they make approaches nearer to that produced by living figures than if they were plain marble; and the mind does not stop to enquire what the canons of good taste say on the subject. The ancients painted the statues of their gods, though carved or sculptured by the first artists.

Ascending Mont Calvary, we came to another building of a similar kind, representing the scene where Mary and her female companions are meeting the procession on its way to Mont Calvary, when

Jesus addresses them, "Weep not for me, ye daughters of Jerusalem," &c. There are twelve of these buildings on the hill, containing representations of the whole history, to the time of the Ascension.

Our journey to Laggo Maggore the following day was deprived of almost all its interest by heavy rains, which continued without the intermission of more than an hour, during which we rowed upon the lake to Isola Madre, and saw something of the luxuriant richness of the surrounding country. Orange trees were growing out of doors in the island, nailed against the garden walls, though a few hours travelling towards the higher Alps, would carry the tourist into the climate of the arctic circle. Near Baveno there is a mountain of highly-crystalline beautiful red granite, which is extensively quarried. This is the only very perfect granite I have seen in the Alps. A great variety of large crystals of felspar, well formed, are found in the fissures of this granite, and are known in the cabinets of mineralogists. They were first discovered by Dr. Pini.

The common granite of the Alps, or *granit veiné*, is capable of being split into slabs of a

moderate thickness, and is afterwards easily worked into different forms. I was surprised at seeing the posts and rails between Domo d'Ossola, and Baveno, made of this granite, and also the posts and cross-bars for supporting the vines. The southern declivities of the Pennine and Grecian Alps, are far more precipitous than the northern. On the side of Piedmont, numerous pyramids, composed of the *granit veiné*, in vertical plates, rise to an amazing height above the valleys, and are beautifully clothed with wood. The geology of the two sides of the central range of the Alps is very different. Suppose a traveller placed on the summit of this range, and looking north towards Savoy, the *granit veiné* is succeeded by lower ranges of mica slate and other schistore rocks, beyond which are ranges of calcareous mountains, more than one hundred miles in breadth, declining towards the plains of France; for the Jura must be regarded as a part of the calcareous band that skirts the northern side of the Alps. Whereas on the southern side, looking towards Italy, the mountains terminate abruptly, the portion of calcareous strata that occurs is very limited, and rocks of serpentine, which are scarcely found on

the northern side, are here abundant. Now, if the theory of Werner were true, that the principal rock formations all over the globe, from granite upwards, were deposited in succession from a fluid that was once higher than the present summits of the highest mountains, there can be no reason assigned for the different succession of rocks which we find on the northern and southern side of the Alps, nor for the strata of limestone extending an hundred miles in breadth on the one side, and being altogether wanting, or occurring only within narrow limits on the other.

From the great fertility of the valleys of Piedmont, the peasantry appear to be in a better condition than the peasantry of Savoy; they are also more favourably dealt with by the government. The Savoyards say, that ever since the ducal court was transferred from Savoy to Piedmont, they who are the elder children of the state are treated as illegitimate; and that all favour is confined to the inhabitants of the southern side of the Alps.

The state of the weather, which appeared to be that of continued rain, made me regret the less, that the plan of our route

had not comprised a longer residence in Piedmont. We crossed the Semplon, and descending the valley of the Rhone, proceeded to Geneva along the Savoy side of the lake, passing one night at Evian, a town which contains about one thousand five hundred inhabitants, and is much resorted to in summer for the mineral waters in its vicinity; they are chalybeate, with a considerable quantity of carbonic acid gas. Evian is pleasantly situated near the lake, and almost opposite Lausanne, from which it is distant about two leagues, in a direct line over the water. The country between Evian and the mountains behind it is extremely rich and beautiful. This would be a most agreeable summer retreat, were the accommodations good, which I should be inclined to doubt from what I saw there; but the season was then over. The difficulty which the custom-house officers oppose to the free intercourse with Lausanne and the northern side of the lake, also prevents visitors from enjoying excursions by water, as they might otherwise do.

Thonon is situated five miles west of Evian: it is a considerable town for Savoy, and was formerly the capital of the pro-

vince called Chablais. This town is opposite to Rolle, in the Pays de Vaud; the widest part of the lake is between Thonon and Rolle. On an eminence to the north-east of Thonon stand the remains of the chateau and monastery of Ripaille. It was originally an Augustin priory, founded by Amadeus the first duke of Savoy, and when he afterwards determined to renounce the cares of government, he chose Ripaille as the most delightful situation in Savoy for a residence, where he might pass the remainder of his days in retirement. He built a château near to the convent, with seven towers and seven suites of apartments, to each of which there was a separate garden, opening into a great park planted with oak trees. In this park were several diverging vistas, through each of which might be seen some town or village in the Pays de Vaud, on the opposite side of the lake, a country then belonging to Savoy. In this castle Amadeus convoked the states of the duchy, on the 7th of November, 1434, and abdicated the sovereignty in favour of his son Louis; at the same time, he instituted the order of St. Maurice, and declared himself grand-master, and fixed his abode

at Ripaille, with six knights who accompanied him. In this delicious retirement, he contrived to combine with the external exercises of devotion the enjoyment of all the luxuries of the age, and the pomp of his former court, wearing over his monkish dress the splendid mantle and cross of St. Maurice, and keeping a costly table, plentifully spread with every delicacy that was esteemed by the epicures of the 15th century. This was the origin of the well known French proverb, "*Faire Ripaille*;" which signifies, to live sumptuously.

Amadeus did not enjoy this tranquillity longer than five years. He was elected pope by the prelates assembled at the council of Basle in 1439; but it was with great difficulty that he was persuaded to accept the dignity; and he is said to have wept bitterly on quitting his favourite retreat. He took the name of Felix the Fifth, and was acknowledged as pope by France, England, Castille, Milan, the Swiss cantons, Austria, Hungary, Bohemia, Savoy, and Piedmont; while all the rest of Europe acknowledged Eugenius the Fourth of Rome. For three years, Felix held his

papal court at Basle, and afterwards at Geneva. After the death of Eugenius, Nicolas the Fifth succeeded him at Rome, and Felix then resolved to abdicate the popedom; induced, as it is said, by a wish to restore peace to the church, but more probably by a desire to free himself from the formal restraints imposed upon him by his dignity, and to enjoy once more the quiet pleasures of Ripaille. By the ambassadors of the powers in the interest of the two popes, a convention was signed, in which Amadeus ceded the popedom and retained the rank of cardinal, with the administration of the archbishoprics of Geneva and Lausanne. This convention being ratified by Pope Nicolas, Amadeus retired once more to his castle and convent of Ripaille, where he passed three years with his knights. He died at Geneva in 1451, and was buried in the church at Ripaille, where a magnificent tomb was erected in honour of his memory. This tomb was destroyed by the Bernese in 1538, in the hopes of finding some treasures within it.

A visit to Ripaille forms an agreeable summer-day's excursion from Geneva: the

distance is about fifteen miles. The most striking object seen on our road from Thonon to Geneva was Mont Blanc, of which we obtained the first view near Coligny, a beautiful village in the territory of the republic.

CHAP. VII.

GENEVA TO LYONS AND CLERMONT. — PASSAGE OF L'ECLUSE. — OBSERVATIONS ON THE CAUSES BY WHICH IT WAS OPENED. — PERTE DE RHONE. — FOSSILS IN ITS VICINITY. — BELLEGARDE. — APPROACH TO LYONS. — A COMPARATIVE VIEW OF LYONS WITH THE LARGE MANUFACTURING TOWNS IN ENGLAND. — HOSPITAL AND ANTIQUITIES. — NOTRE DAME DE FOURVIERE. — EXCURSION ON THE SAONE. — COAL IN THE VICINITY OF LYONS. — IRON MANUFACTURES NEAR FEURS. — THIERS. — PONT SUR L'ALLIEES.

WE left Geneva on the 15th of April, 1822, having engaged a char to convey us to Lyons. It may be useful to state, that we found some difficulty in hiring a carriage at Geneva, from the uncertainty whether a duty would be charged upon it on entering France; nor could this uncertainty be removed by any enquiries we made of the voituriers in Geneva, or of the English or the Genevese themselves; the answers we

received being all contradictory. This may appear extraordinary, as the confines of the two countries are so near Geneva. No tax, however, was levied on the char, though our voiturier was in constant fear of it in every large town through which we passed. The road from Geneva to Lyons runs nearly north for about nine miles to St. Genix, at the feet of the Jura, and then turns westward, keeping close to that range till it is met by the Vouache, which, running northwards from the Saleve, forms the western barrier of the valley or basin of the Lake of Geneva. It was one of the most beautiful mornings I ever beheld; the atmosphere was uncommonly transparent; and Mont Blanc and the Aguilles of Chamouny were brilliant with light, while the sky over the Jura was so intensely blue, that the eye seemed to penetrate far into the immeasurable realms of space. The trees and shrubs, in the beautiful valley through which we were passing, were bursting into leaf: the air was balmy and invigorating; and all nature was clothed in her most enlivening dress, as if to increase our regret at leaving scenes which had afforded us so much pleasure. When the road

turned to the west, the Great Saleve ranged parallel with it on the opposite, or south side of the valley, running in one unvaried outline for several miles; but it had a very singular appearance, for the summit of Mont Blanc was seen over it, and resembled a heap of snow lying upon it, and would have been mistaken for a part of the Saleve, by any one who had seen it from hence the first time. As we travelled westward, this mass of snow appeared to glide along the summit of the Saleve. Nothing can more strongly impress the mind with the vast altitude of Mont Blanc, than to see it tower over a mountain 3000 feet high, which is nearer to the spectator, when we know that its true position is fifty miles behind it.

Approaching Collonges, the mountains round the Lake of Annecy became conspicuous, and revived many agreeable reminiscences. Collonges is considerably elevated above the bed of the Rhône; here we stopped two hours to dine and rest our horse. I enquired respecting the effect of the late earthquake, February 19, which I found had been more severely felt here than at Geneva. The landlady told me

she was leaning with her back against a table, and she was suddenly thrown forward into the middle of the room; indeed, the shock appears to have been more violent in the vicinity of the Rhône than elsewhere, in its course from Geneva to Lyons. We arrived at the fort of L'Ecluse about five o'clock. This fort, situated in the narrow defile through which the Rhône escapes from the basin of the lake, may be said to command the entrance into France. The situation was well described by Cæsar: *Iter angustum et difficile inter montem Juram et flumen Rhodanum, vix qui singuli curri ducerentur; mons altissimus impendebat, ut facile perpauci prohibere possint.—De Bello Gallico, lib.* i. *chap.* 6. "A narrow and difficult road between Mount Jura and the river Rhône, where there is scarcely room for a single carriage to pass, and a high mountain hangs over, so that a very few men might prevent all access beyond it." The great features of the place remain the same, but the road has been enlarged. The fort is situated at a considerable height above the bed of the river, but is overhung by the very high mountain mentioned by Cæsar.

Few persons accustomed to the examination of strata, can reasonably doubt that the mountain called the *Vouache*, on the south side of the Rhône, and the *Jura*, on the north side, were once united. At that period, the waters in the basin of the Lake of Geneva must have filled the whole valley to a great height. By what means was the present passage for the Rhône opened? This question has long divided the opinions of geologists. I believe the late M. De Luc maintained that the strata on each side of the Rhône dip towards the river, and that therefore the passage is coeval with the Jura itself; but this opinion is obviously erroneous, for though the strata of the Jura, before arriving at the passage of L'Ecluse, dip south-easterly to the valley of Geneva, yet the Vouaches and the Jura range nearly north at this passage; and the Rhone, running westward, cuts the strata on both sides (which are almost vertical) at right angles. Those who are acquainted with St. Vincent's Rocks, near Bristol, may form a tolerably correct idea of the passage of L'Ecluse; but the Avon runs between strata that dip at an angle of about 45°, whereas the strata on each side of the

Rhône dip at an angle of about 75°. It is scarcely possible to observe the strata on each side of the river Avon, and entertain a doubt of their having been once united; and I think no one who is not misguided by an attachment to favourite theories, can entertain any doubt respecting the former union of the Vouache with the Jura.

By what cause the passage of the Avon was opened near Bristol, would be as difficult to determine as it would be to ascertain the formation of the passage of L'Ecluse between the Vouache and the Jura; but a rent first produced either by subsidence or by an earthquake, appears, I think, the most natural and probable cause in both cases. Through this rent the waters would rush with great impetuosity, carrying down fragments of rock, which would enlarge the opening, till the lake attained its present level.

The description which Saussure has given of the passage of l'Ecluse is so correct, that I am surprised its accuracy can have been disputed by any one who has examined the place; yet I heard it asserted at Geneva, that the strata on each side of the Rhône dip towards the bed of the river,

and leave an opening for its passage. I found their position very different, and several sections which I took, confirm the accuracy of Saussure's statement, which I shall subjoin. "This opening is the only one through which the Rhône can escape from the bosom of our mountains; if it were closed, our highest hills would be submerged, and all our valley would form one vast reservoir, the waters of which could only escape over the summit of Mount Sion."*

"I have been desirous to discover the origin of this opening, so interesting to us, (the Genevese,) and I have examined it with much attention; my observations, as may well be supposed, have terminated in conjectures. It is, nevertheless, probable that this passage was originally closed, or, at least, was far from being so deeply excavated as at present."

"The mountain of the Voauche appears to be a continuation of the first line of the Jura. This first line, whose general direction is north-east and south-west, changes its position in approaching the L'Ecluse,

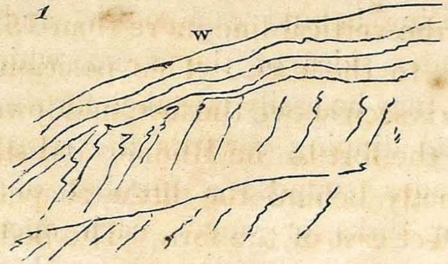
* A continuation of the Vouaches, which joins the great Saleve.

and turns southward, which is also the direction of the Vouache. The beds of the Jura are, at this extremity, nearly perpendicular to the horizon, not declining from the vertical line more than 15°: their dip is to the east. This position of the strata is seen above the fort, and lower down from the fort to the Rhône, and still more distinctly behind the little chapel, about 300 feet east of the fort. The beds of the Vouaches have exactly the same position; they cut the course of the Rhône transversely, a little above the fort of L'Ecluse; their planes, like those of the Jura, are nearly perpendicular to the horizon, dipping at about 15° east from the vertical line. The position of these beds is so remarkable, and so singularly and precisely determined, that it proves, in my opinion, as much as a fact of this nature can be proved, that the Vouache and the Jura were formerly united, and, consequently, afforded no passage for the waters inclosed in our basin." *Voyages dans les Alpes*, vol. i.

Perhaps the different opinions that have been entertained respecting the position of the strata here, originates in an optical

illusion that they present, when seen from different points of view: this the annexed figures may serve to explain.

1



2

B

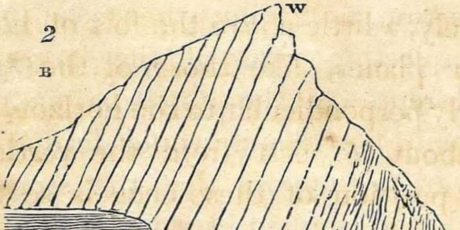


Fig 2, represents the strata on the south of the Rhône, seen in the direction of their bearing, which gives the true angle of the dip, towards B, eastwards. The lower part of the mountain, on the western side, W, is much broken, and covered with fragments, which conceal the stratification.

After proceeding westward about a mile, on looking back, the west side of the same mountain is in front of the spectator, (w, fig. 1,) the strata near the top of it are seen rising behind each other, and here, the under sides of the strata which are visible, may be easily mistaken for the edges of strata dipping towards the river. Let the reader suppose a number of semi-circular disks of wood,. each decreasing in size, to be placed before each other; when seen edgeways they might respresent the section, fig 2; but when seen in front, the projecting rims of the larger disks would represent the upper strata of the mountain, fig. 1, and would lead a hasty observer to suppose that the strata were curved and dipped northward. I have seen numerous instances of a similar kind in the calcareous mountains of Savoy.

A few miles beyond L'Ecluse, before arriving at Bellegarde, we descended to view the place called *la Perte du Rhône*, where this river sinks into the earth and disappears. It may well be supposed that a river like the Rhone, bearing the waters from a hundred miles of the highest Alps in Europe, before it enters the Lake of

Geneva; and which receives beside all the waters from the basin of the lake, seventy miles in length, and all the rivers from Mont Blanc and the north of Savoy, could not suddenly sink down without producing effects inconceivably sublime and awful; but they who expect this will be greatly disappointed. The Rhône, before arriving at *la Perte*, runs in a narrow bed, cut in soft argillaceous strata, which repose on a hard calcareous stratum; but on reaching this stratum, the waters have excavated a deep tunnel in it, into which they fall with considerable force, the rocks on each side approaching so near that a man might have strode across and seen the Rhône pass between his feet at a great depth below; but the Sardinian government have widened the space, by blowing up the rocks, in order to prevent goods from being carried over into Savoy or exported into France without paying the duties. The deep tunnel in which the Rhône runs, is, half way down, divided into an upper and lower channel, by projecting ledges of rock. In winter, and early in spring, the river runs below these ledges, and is nearly concealed; and in one part masses of rock have fallen

down, and covered the lower bed of the river entirely, for about the space of sixty yards. It is possible to descend and walk, with some difficulty, over this part, when the Rhône is low; but in the summer, during the melting of the Alpine snows, the river is much enlarged, and flows over it. The hard calcareous rock in which the Rhône has excavated this deep tunnel, contains few, if any, fossils; but the softer stratum above it contains numerous casts of ammonites, belemnites, trochites, &c. Over this softer stratum is a yellowish calcareous bed, which is often variegated and intermixed with argillaceous and ferruginous earth, in veins and spots. This bed contains numerous lenticular-shaped fossils, that were supposed to be numulites, but which the French naturalists have determined to be small madrepores, and M. de Lamark has given them the name of *orbiolites lenticulata.* In one part which I examined, the whole bed appeared to be composed of these fossils.

The beds above this consist of alternations of calcareous and argillaceous marl, with sand intermixed with particles of green earth. The fossils from these beds

have been recently examined by M. Brogniart, and found to be similar to those from the lowest part of the chalk formation in France and England; indeed, some of them are identically the same. Though the mineralogical characters of these beds, differ in many respects from those of our chalk-marl, and green sand, yet the similarity of some of the fossils, the identity of others, and the intermixture of green particles, appear to justify M. Brogniart in classing the upper beds at the Perte du Rhône, with the lowest part of the chalk formation in France and England, which M. Brogniart denominates *Craie chloritée.*

If the beds at the *Perte du Rhône* be the same as those I observed behind Bellegarde, where the Valteline has excavated a profound section in the strata, they alternate with a rock resembling chalk; at least, they rest upon it. It can excite no surprise that the calcareous formations in the Alps, which are on a scale so greatly exceeding in magnitude any similar formations in England, should present alternations which are no where to be found in our own island, nor is it contrary to analogy to suppose, that in some countries chalk or chalk-marl

may be found alternating with green-sand. Indeed, it is impossible to trace an exact order of succession in the members of similar formations in distant countries, or to set up a standard in any one country, with which the succession of rocks in other countries shall invariably agree. It is highly probable that very different strata might be forming at the same time in remote parts of the globe; nor can we even prove that similar species of fossils in distant regions were contemporaneous; for it is not unreasonable to believe, with Herder, that "wherever the proper conditions for the support of certain species were found, there such species were created." In a certain state of our planet, these successive creations being no longer necessary, have ceased; and it is, probably, that this epoch may be referred to by the writer of Genesis, when he says, the supreme Creator rested from his labours.

On arriving at Bellegarde, we found our char, which we had sent before us from the Pert du Rhône, waiting at the douane. We had been told at Geneva, that the officers of the customs here were particularly vexatious in their search; but we did not

find it to be the case. We had been mindful not to carry with us any prohibited articles. The head officer requested me to assure him that I had nothing contraband. I told him I could safely do so, except books, which they might examine: he said that it was only religious books that they were ordered to prohibit. They opened all the boxes, but were satisfied without unpacking them. I offered half-a-crown to the man who had opened the trunks, which he refused, saying, he had done nothing but his duty, and never took money for it. This was the first time that I ever knew money refused by the under-officers of the customs. I should not have thought it necessary to mention these circumstances, had I not heard such exaggerated accounts of the difficulties of passing the douane at Bellegarde, that I thought it might be useful to state the fact. I believe that persons who scrupulously avoid carrying prohibited articles, and who exhibit no fear of search, will not, in general, experience more inconvenience than is unavoidable. The officers acquire a certain tact for discovering whether travellers have any thing with them which they are anx-

ious to conceal. At Bellegarde we left our passport, which was forwarded to Paris, and I received an acknowledgment, which served us on the route.

We slept at the Hôtel de la Poste, at Bellegarde, a good inn; and the next morning the landlord conducted us to see a singular excavation made in the rocks behind his house by the river Valteline, which falls into the Rhône below Bellegarde. The first excavation is about one hundred and twenty feet broad, and one hundred and fifty feet or more in depth, with a nearly flat floor of rock at the bottom. In rainy seasons, or after the thawing of the snows on the Jura, the river flows over the whole of this floor to a considerable depth, but in drier seasons it is confined to a narrow channel, cut to a great depth into the rock, which opens below and forms a tunnel, as at the *Perte du Rhône*. On each side of the channel there are large hollows like caldrons, which have been excavated by stones whirling round within them, as described at the cascade of Grisey, near Aix, (vol. i. p. 148.) The rock which forms the floor of this excavation bears so strong a resemblance to chalk, that few persons would hesitate

in calling it so, from the external characters alone: it is white, earthy, sectile, and will mark, and is as soft as some of the English chalk near Flamborough Head; but when it is removed, it becomes hard, and loses its chalky character, resembling some of the white limestones in Savoy, which latter frequently present the shattered appearance of the Kent chalk.

The section of the rocks made by the Valteline, presents on each side —

No. 1. A variegated yellow limestone.
2. Yellowish calcareous strata.
3. The lower white rock resembling chalk, in which the channel of the Valteline is cut.

The variegated limestone, No. 1., I was informed, frequently contained fossils of the size and shape of apples, which were, doubtless, echinites. I must leave to future observers to determine whether the white rock, No. 3., which resembles chalk, really belong to the lower part of the chalk formation.

It may be proper to state, that before arriving at the Fort de l'Ecluse, I observed

limestone on the road, exactly similar to the Gloucestershire oölites.

The road from Bellegarde to Lyons winds among the calcareous mountains that form the outer ranges of the Jura, and passes by the side of two small lakes; the first, the Lake of Sylant, is surrounded by steep mountains, covered with firs, and has a very gloomy appearance. The water is almost black from the reflection of the dark objects on its sides, and there are no villages on its banks, or boats upon its surface, to enliven the scene. It is about two miles in length. About a league beyond this lake, we passed through the town of Nantua, where we dined. This town contains two thousand seven hundred inhabitants. The women were sitting at their doors employed in tambouring muslin, by which they only gain about two francs a week, working from morning to night.

After dinner, we passed along the Lake of Nantua, which may be about three miles in length, and has evidently once been longer than at present. It is about half a mile broad, and is situated between two ranges

of mountains, that approach near to the water. The cray-fish of this lake are much esteemed by epicures. At the end of the lake the road turns suddenly to the west, and winds under some very striking precipices, which terminate the alpine part of this route.

Several of the rocks we passed by presented remarkable sections, in which the stratification appeared singularly arranged. One rock at no great distance from the embouchures of the Jura, and near the road on the south, had its strata on the eastern side vertical, while a few yards farther west, they were perfectly horizontal, or appeared to be so ; but I suspect it was a deception arising from the cleavages, similar to the case in the valley of Thones, of which a figure is given, (vol. i. p. 68.) A little farther, in another range, the lower strata appeared vertical, and the upper horizontal. These rocks are about two leagues east of Pont d'Ain, but the day was too far advanced to permit me to descend and examine the stratification. It was nearly dark before we had fairly emerged from the calcareous ranges of the Jura, and found ourselves in an extensive plain, in

which the river Ain runs through beds of alluvium. We crossed the river at a bridge which gives its name to the town of *Pont d' Ain*, where we slept.

From Pont d'Ain to Montluel, about twenty-five miles, the soil is bare and stony. About two miles beyond the latter place, the soil improves, and the appearance of the buildings indicate the affluence of the possessors; but from the confines of Geneva to this place, a distance of about seventy-five miles, we had not seen a single gentleman's house, nor any house which might be supposed to be the residence of an opulent farmer. The mode of cultivation was very indifferent: I saw a team of six oxen, headed by one horse, ploughing in a field where the soil did not appear particularly stiff.

Approaching to Lyons the soil was more highly cultivated: barley was in full ear, (April 17,) and ready to bloom; the foliage of the trees was expanded, and numerous nightingales were singing in the bushes by the road side.

Many gentlemen's houses, with extensive gardens and vineyards, announced our proximity to an opulent city, as we pro-

ceeded. We arrived at the Hotel du Parc, in Lyons, at seven o'clock, where we remained six days, and were very well satisfied with our host and hostess.

I shall leave to other travellers the task of describing a city so well known as Lyons; but as it is one of the principal manufacturing towns in France, I shall state the advantages of its situation, and other circumstances which may enable the reader to compare it with the large manufacturing towns in Great Britain. The magnificent rivers, the Rhône and the Saone, which flow on the north and south side of this city, offer natural facilities for commerce, which are possessed by few towns so far removed from the sea. These rivers open a direct communication with the Mediterranean and with the interior of France. Lyons is built at the extremity of an extensive and fertile plain, but immediately under a range of mountains that shelter it from the north and north-east. Their sides are richly adorned with wood, and thus form a beautiful back ground to the view of this city seen from the south. Numerous villas placed on the different eminences, afford delightful summer retreats to the

opulent citizens. The winter at Lyons is less severe and of shorter duration than at Paris; but the heat of the summer months is unfavourable to manufacturing industry; for who that is not compelled by dire necessity, would remain confined many hours in a close room, when nature is displaying all her beauties under a genial sky to invite him away? For man, considered by political economists as a mere manufacturing machine, created for the sole purpose of producing the greatest possible quantity of work in the least given time — for man, I say, so considered, the climate of the south of Europe is far too good. Whereas, the threatening skies and chilling blasts in our northern counties, drive the weaver to his loom, and the cutler to his forge, and compel him to remain there till he is tempted by fatigue to seek warmth and comfort in the meeting-house, or the ale-house. In respect to climate, therefore, Manchester and Glasgow have greatly the advantage over Lyons as manufacturing towns, except that Lyons enjoys two hours more daylight in the winter months. Coal of a good quality is found at no great distance from Lyons; the nearest pits are about

seven miles below the city, not far from the Rhône. What the quality of this coal may be, I do not know; that which is obtained about fifteen miles north of Lyons is excellent. The Lyonese are, however, only beginning to avail themselves of its use in their manufactures.

The inhabitants of Lyons and its suburbs formerly amounted to 160,000; they are now estimated at 150,000, their number being diminished during the revolution. Indeed, the number of inhabitants in the city itself, without comprising the suburbs, is stated, in the census taken in 1820, at only 100,041. The principal manufactures are that of silks and gold and silver tissues, for which this city has been long celebrated; the manufacture of galloons, ribbons, and bindings; and, thirdly, of hats, bonnets, and stationary wares, to which must be added gold and silver wire-drawers, dyers, &c.: these different manufactures are said to employ eighty thousand persons. Before the revolution it was the boast of the Lyonnese merchants, that they bought every thing with ready money, and gave credit to all the world.

Mr. Matthews, in his " Diary of an Inva-

lid," says, that the people of Lyons looked at the English with an envious eye, and were particularly uncivil. This he attributes to their fear of our taking away their trade. As this writer is on all other occasions candid and liberal in his remarks on the character of foreigners, it may afford him some satisfaction to learn, that whatever might be the feelings of the Lyonnese towards the English at the period when he visited the city, they are at present as courteous to British travellers as the natives of any other town in France. I speak this not only from my own observation, but from the information of an English family who passed a winter here, and gave a very favourable account of the people. I had an opportunity of seeing a large portion of the manufacturing population of Lyons amusing themselves in the fields on a fête day. There were several thousands playing at bowls and other diversions; their wives and children were also present. I was highly gratified in observing the quiet cheerfulness, sobriety, and good temper which prevailed, and the respect and civility with which the lowest classes of citizens addressed each other. It was alto-

gether different from the vociferous brawling, swearing, and quarrelling, which would have been heard among the same number of English people collected in any of our manufacturing districts. From all that I have seen and heard of the labouring classes in France, including the peasantry, I am compelled to believe, that they are superior both in morals and manners, to the same classes in England, and that instances of gross brutality and depravity are more rare among the French than among the English populace.

There are two bridges over the Rhône, leading to the south of France, and six or seven bridges over the Saone. The quais and buildings facing the Rhône are very magnificent. The square called *Place Bellecour*, is spacious, and worthy of a great city. At each end are two very handsome buildings; they are exactly similar. On one side is a public promenade, planted with rows of trees. The quais and buildings, and bridges on the Saone, have also an imposing appearance; but in the interior of the city the streets are narrow, dark, and intricate, like those in all very ancient towns.

The city of Lyons was first built on the hill north of the Saone, called now *Colline de Fourvière*; a magnificent aqueduct, to supply it with water, was constructed by the order of Marc Anthony. Agrippa, in the reign of Augustus, made this city the centre or point of junction of four great roads, which divided France. Lyons was also embellished by various temples and public buildings, but was destroyed by fire in one night, a century after its foundation.

In the hill of Fourviers numerous relics of the ancient city are frequently dug up, such as lumps of melted bronze, and tables of marble, &c. After the city was rebuilt, the emperor Trajan ordered a magnificent edifice to be constructed for the markets and courts of justice. This building fell down in A. D. 840. In the chronicles of the ninth century, it is called *Forum Vetus*, from whence *Fort Viel* and *Fourviere* are derived. There is a chapel, dedicated to the Virgin, called the chapel of *Notre Dame de Fourviere*, placed where the Forum Vetus formerly stood: this chapel has been long celebrated for the miracles which the Virgin performed, and pilgrimages to Fourviere were undertaken from a great dis-

tance. During the revolution the chapel was closed, till the pope, on his last visit to Lyons, in 1804, ordered it to be re-opened, and ordained that plenary indulgences might be granted here daily. The anniversary of this precious gift to the chapel of Notre Dame de Fourviere, was celebrated while we were at Lyons, by a religious procession, which set out from the cathedral and mounted the hill to perform a grand mass in the chapel. It was announced the day before by printed bills, posted all over the city, and containing the order of the archbishop for the ceremony. The people of Lyons took little interest in this religious farce. A number of old women, of the lower class, carried tapers, and were preceded by the choristers of the cathedral, and about twelve priests, some of whom were excessively corpulent, like the friars of the "olden time;" their appearance told plainly that they knew how to grant themselves "plenary indulgence" without the aid of the pope. The procession ascended the hill, chanting, and we followed it into the chapel, which contains nothing worthy of notice, except the *ex-voto* offerings that are hung up in immense

numbers against the walls, to exhibit the pious gratitude of the votaries of the virgin, who had been miraculously cured by her assistance, or delivered from shipwreck or other imminent dangers. These offerings consisted principally of small paintings, representing the situations from which the parties had escaped; others were, legs, arms, and noses, the models of limbs or members that had been healed. Some of the offerings dedicated to the virgin were small caps and bonnets; but on what occasion they were presented I could not learn.

From the summit of Fourviere there is a fine view of the city of Lyons, which is seen with its two rivers, like a map, immediately below, and beyond the Rhône the eye travels over the plains of Dauphiny, extending to the feet of the distant Alps.

The public infirmary, or *Hotel Dieu*, at Lyons, is one of the most ancient, as well as one of the largest charitable institutions in Europe. The building, which is in the form of a cross, is of immense size, and is surmounted by a magnificent dome. It contains 1200 beds, and apartments for 300 more patients are building. Eighteen

thousand patients are annually admitted, on the average, into this hospital. There are 150 sisters of charity, who attend the patients, and about 150 domestics. The apartments are thirty-two French feet broad, and twenty-five in height: the bedsteads are all of iron. We went over the building; every thing appeared to be conducted with as great order and propriety as could possibly be expected in so large an establishment. It is partly supported by voluntary contributions. Beside the patients who are admitted gratis, there is one ward for the accommodation of those whose circumstances will allow them to pay for their board, but who either have not accommodations for being properly nursed at home, or who expect to have better advice and attendance here. These patients pay two francs, or 1*s.* 8*d.* per day. There are also rooms for more opulent patients, chiefly foreigners, who are taken ill in the city. They pay from seven to twelve francs per day. It may deserve consideration whether a similar arrangement for the reception of patients, who could afford to pay for their board, but who have few conveniences at home which the sick re-

quire, might not be introduced with advantage into this country. This hospital was founded by king Childeberg, the son of Clovis, and queen Ultrogothe, his wife, near the beginning of the sixth century. Two colossal statues of the founders are placed in the front of the building facing the Rhône. The hospital is open for public inspection five days in the week; strangers who visit it are expected to contribute something to the institution on going away.

The *Hospice de la Charité* is also a very extensive building, in which four hundred aged persons of both sexes are maintained. Part of the building is devoted to the support of orphans and foundlings, and another part is appropriated for a lying-in hospital.

There are many other charitable institutions in Lyons, which the short period of our residence here did not admit us to visit.

The museum, or Palais des Arts, is a spacious and magnificent edifice; before the revolution it was an abbey for the nuns of St. Benoit, each of whom, previous to her admission, was obliged to prove her titles of nobility, as none but the daughters of nobles were admitted into this foun-

dation. At present the museum contains an immense number of the relicks of antiquity and works of art, chiefly collected in this city. The lower part of the building is filled with Roman sepulchral monuments, sarcophagi, altars, inscriptions, and military columns. Amid these remains of ancient greatness, the imagination awakes, and we feel more respect for the ground on which we tread—the birth place of Germanicus and Marcus Aurelius,—the seat of bishops, the immediate successors of the apostles,—and a soil consecrated by the blood of a host of martyrs.

Among the sepulchral monuments, the greater number were dedicated to the memory of private individuals by their nearest relations; the inscriptions indicated far more tenderness and affection than might have been expected, among a people whose public acts and amusements were so cruel and ferocious.

We hired a boat and went up the Saone, to view the majestic scenery on its banks. This river is about the width of the Thames at Windsor; rocks of granite, in some parts, rise immediately from the edge of the water on both sides, and are surmounted

by forts, ruins, or villas, and where the sides are more sloping, they are adorned with horse-chesnut trees, which were then in full flower. There is a *coche d'eau* on the Saone, that goes from Lyons to Chalons, and returns every day in summer; and if the scenery continues similar to that near Lyons, it must be a most delightful excursion. Many of the citizens go by this conveyance to their country-houses, situated near the banks of the river. The number of these houses give to the country round Lyons much more the appearance of being the vicinity of an opulent city, than the country round either Paris, Dublin, or Edinburgh.

I examined the rocks on each side the river to Port Jean; they consist of a small grained granite, with brilliant laminæ of mica, and in some parts it passes into gneiss. An elderly respectable-looking woman rowed us on the Saone; she was plainly but neatly dressed: she told us she had followed that occupation from ten years of age, which had also been the occupation of her mother. She said she very much wished to ask me one question, for she knew, as an Englishman, that I could tell her the truth. On desiring her

to state her question, she enquired with much earnestness, "Is the emperor really dead? We have been told it," she said, "many months, but we know not how far we may believe what is published by the present government." On assuring her that the emperor was dead, the tears rolled down her cheeks, and she rested on her oars to give vent to her grief. She said, "We had hoped to see him once more in France, for he was the man best suited to promote our prosperity." She had lost two sons in the army. On passing a fort, placed on a rock, she exclaimed, "Ah! there I saw the emperor for the last time; he mounted the rock, on his white horse, and none of his officers had the courage to follow him." This feeling of attachment to Napoleon, or rather of aversion to the present government, appears to be general through that part of France which I passed. In all the coffee-houses which I entered the liberal journals were read exclusively. That this feeling should be general need excite no surprise. The French have little confidence in the present government; and they are fully aware that it is a settled design of the ultras to take away every

remains of a free constitution, and to restore the old regime, with tithes, and feudal privileges.

The junction of the Rhône and Saone takes place about a mile below Lyons. The quantity of water in the Rhône varies much with the seasons, owing to the melting of the ice and snow on the Alps, from whence it descends. When we were at Lyons, the water was comparatively low; it was about as broad as the Thames at Battersea, but much more rapid in its course.

I hired a *coupé*, or chariot, of our landlord, M. Levrat, at the Hotel du Parc, with two stout horses, to convey us to Clermont: the distance is about ninety English miles, over a mountainous country. The price was five napoleons, as it was a six days' journey for the carriage, going and returning, and the landlord paid all expenses for the horses on the road. The whole of our first day's journey was rainy. After crossing the Saone, the road began to ascend among the granitic hills, that form branches from the range of the *Forez* mountains. The scenery reminded me of Devonshire. We stopped to dine at a village called Duern, and were ushered

into a room with a comfortable coal fire. The coal was hard and shining, and burnt with a clear flame, like the coal of Staffordshire. We were informed that the pits, which are situated about a league west of Duern, were worked at the depths of 400 and 500 feet. After dinner we passed over the coal field, but the rain still continued to fall heavily, which prevented me from examining it more fully. The coal strata occupy a basin or trough, to the bottom of which they dip on each side. The beds of granite, on the east, appear also to dip in the same direction. The granite abounds in felspar, which, by decomposition, passes into red earth, succeeded by coarse sand and conglomerate. We passed by a coal pit at the bottom of the valley, which is not worked at present, being full of water, but we were told that it is 160 feet deep. In ascending the other side of the basin, we came to a coarse conglomerate rock, and after that to granite. The conglomerate may be regarded as interposed between the granite, and the series of coal strata. The granite, which was exposed to the atmosphere, was much disintegrated.

Near the coal pit before mentioned, I observed the road mended with a dark stone, resembling basalt, but which, on examination, appeared to be an intimate intermixture of hornblende and felspar. Towards evening we descended to the town of Feurs, situated in the upper valley of the Loire, which here forms an extensive plain, situated between two parallel ranges of mountains. Some of the mountains on the west were of considerable height, for I observed them covered with snow; as far as can be estimated by the eye, I should suppose the highest part of the range to be as high as the Jura. The next morning, on going into the yard to speak to our voiturier, I was surprised at being accosted in English by a man who was sweeping out the stables: on enquiry, I learned that he was taken prisoner at the siege of Toulon, and that he had married a French woman and settled in the country. He informed me that several English iron master manufacturers and workmen had established themselves in the vicinity of Feurs, and that the iron trade was very much increasing and improving. He said some English work-

men, who were lately come over, were bringing the manufacture of steel to great perfection. We crossed the rivers Loire and Lenon in ferry-boats, but the road to Clermont is so seldom travelled, except by the public diligences, that we were obliged to wait a very long time for the ferry-man at the latter river. We soon after entered into the narrow defiles of the mountains of Forez. Before arriving at the town of Boen I observed the rocks were of red and grey sienite, and sienitic granite exactly resembling the rocks in Chamwood forest. We slept at a village or town called La Bergere, where I met with the first and only striking instance of an attempt at gross imposition in the charge, our hostess claiming ten franks for the lodging room; I gave her five, and we parted, with the music of her voice ringing in our ears, though she knew very well that she was overpaid. The road from La Bergere to Thiers ascends, and runs along the side of granitic mountains that impend over deep precipices. It resembles some parts of the Semplon road: this road was commenced by order of Napoleon. Before arriving at Thiers we had a view of

the Puy de Dome and the mountains of Auvergne. The former mountain I recognised at first sight by its dome-shaped summit. Several of the inhabitants that we met near Thiers were very plainly dressed, and had an air of gloomy austerity in their countenances, which convinced me that they were Calvinists or Huguenots. I was anxious to enquire, but I knew that if I were wrong in my conjecture, it would have been considered a gross affront to have read heresy in their countenances; so I repressed my curiosity. Thiers is a considerable manufacturing town, containing upwards of 10,000 inhabitants; the country around appears populous, and many new houses are building. The principal manufactures are coarse cloth, thread, cutlery, and paper. The river Thiers runs below the town. Leaving Thiers we afterwards passed a broad plain or valley, and crossing the river Allier, over a stone bridge, we ascended to the town, which takes its name from this bridge, Pont sur l'Allier,* where we found ourselves on the volcanic soil of Auvergne.

* It is called Pont du Château in the map of Auvergne.

CHAP. VIII.

AUVERGNE.

DISCOVERY OF THE VOLCANOES OF AUVERGNE, IN 1751. — A GENERAL VIEW OF THE VOLCANIC MOUNTAINS NEAR CLERMONT.— EXCURSION TO THE PUY DE PARIOU, &c. — APPEARANCE OF THE INHABITANTS OF THE MOUNTAINS. — THE PUY DE DOME. — OBSERVATIONS ON THE LAVA AND CRATER OF PARIOU. — MONTADOUX. — THE PUY DE CHARRADE. — VOLCANO OF GRAVENIRE. — PUY DE LA POIX.— PUY DE CRUELLE. — OBSERVATIONS ON THE REMARKABLE POSITION OF THE BEDS OF TUFFA. — VISIT TO GERGOVIA. — THE AUTHOR DISCOVERS BONES OF LARGE QUADRUPEDS IN THE LIMESTONE UNDER THIS MOUNTAIN. — CITY OF CLERMONT.

OUR voiturier, being unacquainted with the road, had passed the house where he was directed to rest his horses, which obliged him to halt at *Pont du Chateau.* This was fortunate, as I should otherwise have lost the opportunity of examining some remarkable volcanic rocks in the vicinity,

for I had never seen any description of volcanic rocks extending so far east of Clermont. Walking out while dinner was preparing, I observed a low range of rocks, resembling heaps of cinders consolidated: the surface was soft, but striking off a fragment with my hammer, I found that it was internally coated with a black shining substance, which, on examination, proved to be indurated bitumen. Part of the rock was spongy and cellular; other parts were compact, and it contained the volcanic minerals, fiorite and hyälite. Globules of the latter were plentifully scattered on the ground. I now perceived that this rock was a part of the volcanic tuffa of the country, characterised by the presence of bitumen, which I had been informed was common near Clermont. I felt no small degree of pleasure in finding myself in one of the most remarkable districts in Europe, placed nearly in the centre of France, and surrounded by a well-cultivated and populous country, but exhibiting incontestible proofs of a mighty conflagration, that has, at a former period, spread over many hundred square miles. The marks of the powerful agency of fire

are so fresh, that the spectator might suppose in some parts it had scarcely ceased to burn; yet there is no record of any volcanic eruptions having taken place since the time when Cæsar was encamped in Auvergne, nor was Cæsar aware that the country was volcanic. Indeed the fact was unknown until the year 1751, when two naturalists, who were returning from Vesuvius, stopped to botanise on the mountains in Auvergne, and were surprised at the resemblance which these mountains presented to that celebrated volcano. They were particularly struck with the similarity of the lavas and minerals in both. M. Guettard, one of these naturalists, published an account of this discovery; but it appeared so extraordinary that it was not generally believed. Future observers, however, confirmed the truth of M. Guettard's statement, and proved in a satisfactory manner the existence of ancient volcanoes in Auvergne; yet the attachment to particular theories induced certain geologists in this country to withhold their assent, and even to question the veracity of the accounts which had been published. Nature fortunately remains more stable than pro-

judice, and the volcanic characters of the rocks in Auvergne are so clearly and indelibly impressed, that they cannot be called in question by any one who has examined them; nor can these volcanic characters be removed, except by some future revolution of the globe.

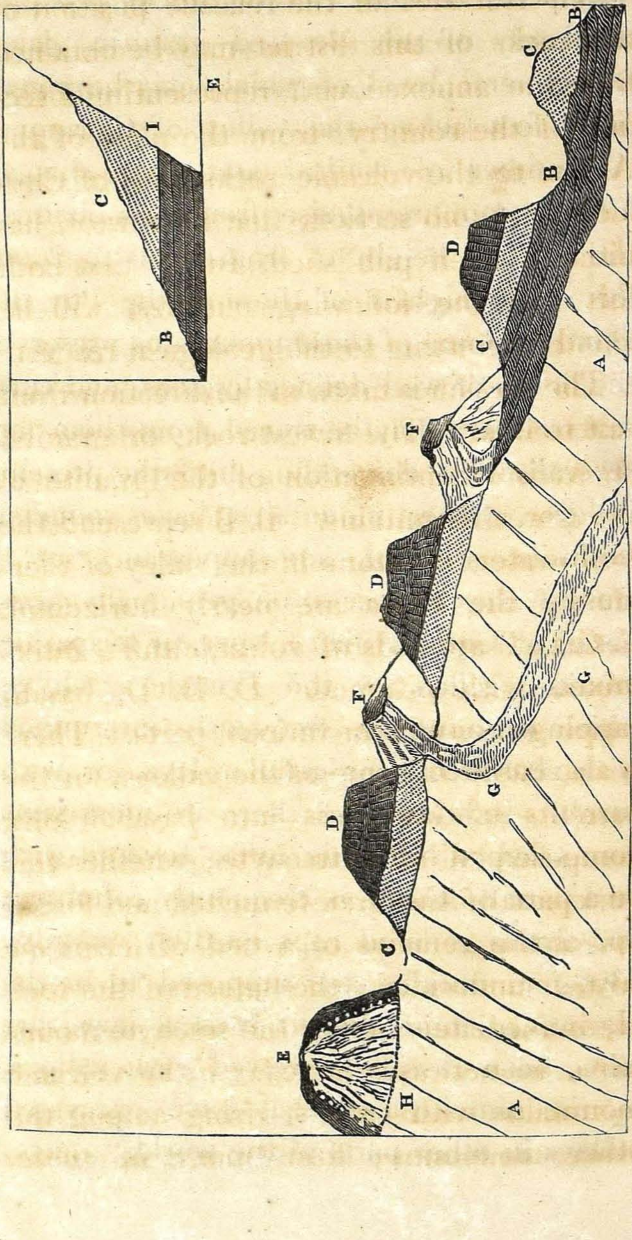
To enable the reader to form a distinct idea of the country round Clermont, it may be useful to trace the outline of the principal formations, and their relative position, before I proceed to describe the different volcanic mountains which I examined.

Ranges of granitic mountains*, which run nearly north and south, extend in breadth from the Saone at Lyons, to the Allier near Clermont: the granite is continued westward into Auvergne, and forms the substratum on which the volcanic rocks repose.

In the neighbourhood of Clermont a series of strata of fresh-water limestone cover the sides of the valley, and appear in the surrounding hills to be interposed between the granite and the volcanic rocks. Ascending westward, all traces of the limestone

* These are called the mountains of Forez.

disappear, and the volcanic rocks rest immediately on an elevated granitic plain, the general level of which may be about 1600 feet above the valley of Clermont. A number of conical and dome-shaped hills or mountains rise from this plain to the further height of from 1000 to 2000 feet: the highest of these is the Puy de Dome. Some of these mountains preserve the forms of well defined craters, and currents of lava may be traced from them for several miles, descending into the present valleys. Other mountains have rounded summits, without any appearance of a crater: they appear to be principally composed of semi-vitrified felspar, or felspathic granite, called by the French trachyte, which is, however, frequently intermixed with scoriaceous or cellular lava, or with basalt. Besides these, there are mountains composed of volcanic tuffa, covered with dark basalt, which is frequently columnar, and forms isolated caps on their summits. These mountains are supposed to be the remains of more ancient beds of lava, that have been deeply furrowed with valleys, by the same causes that have excavated valleys in other parts of the world.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A better idea of the relative position of the rocks of this district may be obtained from the annexed cut, representing a section of the country, from the plain of the Allier, to the volcanic rocks west of Clermont. As no section, that I know of, has hitherto been published, I trust that both this and the following outlines, will be found interesting to the geological reader.

The section is taken in the direction from east to west. The lowest rock, or granite, A. A, is a continuation of the granite of the Forez mountains. B. B represents the fresh-water limestone in the valley of Clermont; the strata are nearly horizontal. C. C. C. C are beds of volcanic tuffa, intermixed with bitumen. D. D. D, basalt, capping the tuffa in various parts. There is also basalt in some of the valleys, for the currents of lava pass into basalt. E, a dome-shaped hill of trachyte; whether this be a part of the granite melted and forced up, or the remains of a bed of felspathic lava, is undecided; the nature of the rock H, immediately under the trachyte mountains, is not ascertained. F. F, volcanic mountains with craters, rising among the other mountains; from many of these,

currents of scoriaceous and cellular lava, G. G, may be traced for several miles, descending into the valleys.

This is an enunciation of the present appearance, and the position of the principal volcanic and other rocks in the vicinity of Clermont, unconnected with any hypotheses. Except that the relation of the rock E to the subjacent rock H, is unknown, as I have before mentioned; and I do not think it absolutely certain that the limestone B. B extends under the volcanic rocks that appear to rest upon it, though the limestone may be traced nearly round them, as at Gergovia and the Puy de Cruelle, which I shall afterwards decribe. It is *possible* that the limestone might have been deposited, after the mountains which seem to cover some part of it were formed; for the calcareous strata may have filled the valley to a certain height, and have been subsequently excavated, leaving a portion of limestone round the bases of these mountains. This limestone might have been protected by the volcanic matter that had fallen upon it, as represented in the figure, above the section, where the calcareous strata B are supposed to extend

no farther than the mountain I, but to be covered by tuffa at C, which had fallen upon it. It is also possible that the mountain I, may have been forced up through the strata at B, and certain appearances at the Puy de Cruelle indicate that some disturbance of the strata has taken place. I think it right to state these doubts respecting the position of the limestone, though I incline to the opinion of the French geologists, that the limestone was deposited prior to the formation of the volcanic beds; and therefore that its true position is represented in the annexed section. In some situations farther south, basalt is seen covering the fresh-water limestone.

If we admit that the matter which forms the mountains D. D. D, C. C. C, has once flowed as lava, we must admit also, that the tuffa and basalt in each were once portions of continuous beds, whatever may be the causes by which they were separated. I shall not stop to inquire, at present, whether they were detached by the gradual erosion of water, or by the partial subsidence or elevation of the crust of the globe. It is deserving of notice,

that the volcanic tuffa, basalt, and trachyte, as well as the scoriaceous and cellular lava, are in some situations intermixed, or appear to pass by gradation into each other. Thus the cellular lava is seen to become less porous, and terminate in compact basalt, and the trachyte or semivitrified granite, contains imbedded masses of scoriæ.

The fresh-water limestone resembles a coarse chalk, or more properly a chalk marl: it is in some parts associated with clay and sandstone. At Gergovia it forms very regular strata, from two to three feet in thickness, separated by beds of indurated argillaceous stone, or what is vulgarly called clunch: all these beds are nearly horizontal. In two of the beds of this limestone there are numerous bones of mammalia, similar in preservation and appearance to those of the paleotheria, and other animals found in the gypsum of Montmartre. I was not so fortunate as to procure any of the maxillary bones or teeth, but I obtained portions of tibia and ribs. The occurrence of bones of this description in the limestone of Gergovia, has not, I believe, been noticed by any geologist, and it was unknown to the professors at

Paris, when I passed through that city in 1822. The specimens I collected at Gergovia were packed up and forwarded to England, or I should have availed myself of the opportunity of identifying them with the fossil remains from Montmartre, during my residence in Paris. The fresh-water limestone is extensively spread over many parts of the south of France; and shells and bones, similar to those in the Paris basin, have been found in it. The reason why bones of the mammalia have not been discovered earlier at Gergovia, is owing to the recent opening of the quarries where they occur. The men informed me they had found one thigh bone, a few months before I was there, as large as that of an ox. If the fresh-water limestone really extends under the older volcanic rocks, the relative age of the latter is fixed as posterior to the gypsum formation in the Paris basin.

One of our first excursions from Clermont was to visit the Puy de Pariou, about seven miles west of that city. We started early in the morning. The road ascends in a zigzag course to the elevated plain, on which most of the volcanic mountains are

situated. It was market day, and we met a long train of carts with wood, each drawn by four oxen, coming to Clermont. The road was so precipitous and winding, that they seemed to be moving in different directions as they descended, and we saw them approaching us for nearly an hour before they passed us on the road. The dress and appearance of the mountaineers who were conducting the carts, were very striking; with immense broad-brimmed hats, long lank hair, gaunt features, and striped cloth cloaks, that reached nearly to their feet, they bore no resemblance to Frenchmen, and they spoke a different language. I believe they are the descendants from the same race who resisted Cæsar, for whatever changes may have taken place in other parts of France, none of the warlike hordes who ravaged the more fertile parts of the country in succeeding ages, would have wished to take possession of the sterile mountains of Auvergne, or to undertake the task of driving out the original inhabitants. I was much surprised, in entering some of the houses, to observe that the lamps, water pots, and other earthen-ware vessels were of the same form as the Etrus-

can vessels from Herculaneum, and are doubtless made after models transmitted from very remote antiquity, as vessels of these forms are not common in any other parts of France that I have visited. The music of the Auvergnats is the bagpipe. In a history of Auvergne which I met with at Clermont, I found that some of the strongest castles in the country were at one period in possession of the English.

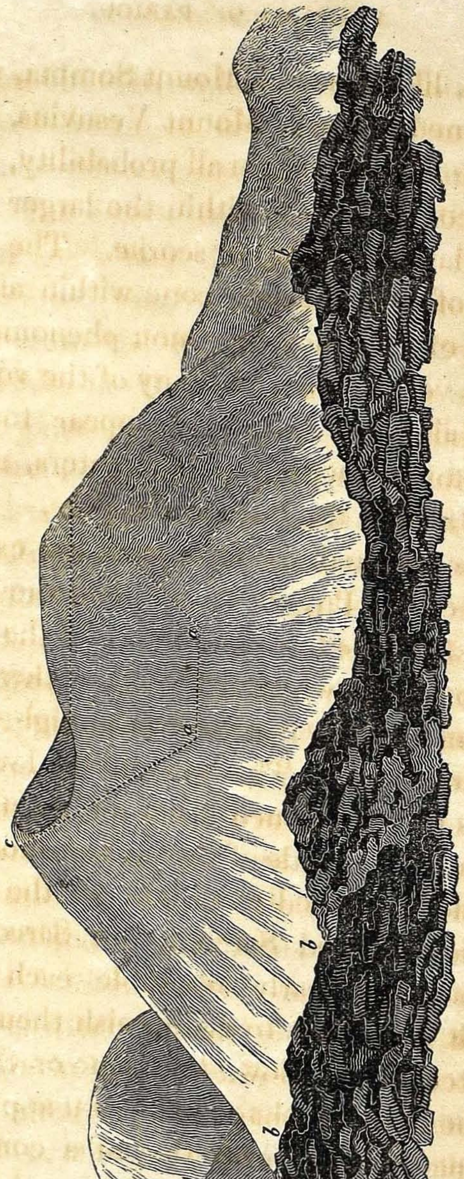
In ascending we passed various volcanic rocks, and before we arrived at the little hamlet, called la Barraque, we saw part of the great current of lava from the Puy de Pariou. The road made a section through it, but I suspect it is here intermixed with more ancient lavas. Some men were getting stone by the road side, and had opened a bed of basalt, which was divided into regular columns; it contained a great quantity of olivine in nodules, which had a granular structure: it is what the French call *peridot granuliforme.* The basalt was in some parts compact, in others cellular; passing by gradation into scoriaceous lava. The columnar basalt, I found was divided by seams, cutting each column at right angles to the axis, into thin plates.

This might be compared to the cleavages of a regular prism of the beryl, and I suspect was the result of crystallization on a great scale. We waited some time at a little inn at la Barraque for a peasant who officiates as a guide to the mountains. From this place, which is situated on the elevated volcanic plain before mentioned, about 1500 feet above the town of Clermont, there is a near and distinct view of the upper part of the Puy de Dome, rising in the form of a cupola. The summit of this mountain, so celebrated by the barometrical experiments of Pascal, is 1477 metres, or 4797 English feet above the level of the sea, and 3451 feet above the town of Clermont; though from the plain on which it stands, the summit does not rise more than from 1900 to 2000 feet; yet the regularity of its form, and its abrupt ascent, render its appearance very striking. As a volcanic mountain, it is less interesting than many others, being one mass of semivitrified felspathic granite, varying in its texture and hardness, and has no discoverable crater at the top, but its flanks are covered in some parts with scoriaceous lava, and there is one small cra-

ter low down on the northern side, called the *Nid de Poule*, or hen's nest, which has a very regular form. In all probability this crater was formed at a much later period than the Puy de Dome.

The road from la Barraque to the Puy de Pariou passes near a great current of lava, which has flowed from that mountain; this lava rises to the height of from thirty to sixty feet above the plain; from the surface there are numerous projecting ridges, which seemed like the fractured portions of enormous waves, that had been congealed and then broken by the progressive motion of the current. We passed over this current twice; it is covered with scoriæ, and masses of basaltic lava. We were one hour in going from la Barraque to the foot of the Puy de Pariou, where we left our char, and another hour in ascending to the summit, as we halted several times to rest. As nearly as I could estimate, the summit of this mountain rises about one thousand feet above the plain, and is therefore about three thousand eight hundred feet above the level of the sea. The crater, which is the best preserved of any in Auvergne, is nearly circular. I walked round it, and

estimate its circumference at about eight hundred yards. Its shape is that of an inverted cone or funnel, quite perfect. The edge or rim of the crater is narrow, from which the descent or slope is very rapid on each side; the depth of the crater from the highest part of the edge, (which is on the southern side) to the small plain at the bottom, may be about three hundred and twenty feet, and from the western side, about two hundred and sixty English feet. The lava which flowed from Pariou to la Barraque, and thence towards the plain of Clermont, is generally supposed to have issued from the crater, but had this been the case, the crater would not have been so entire as it is, and I am fully convinced that the eruption of such a mass of lava must have broken down one of the sides, as at Nugere, which we afterwards visited, and the Puy de Vache. There appears, I think, decisive marks of the lava having flowed from an opening on the north-east side of the mountain, to which it may be traced. Indeed on this side there are the indications of a much larger crater, which has its escarpements turned towards the Puy de



Pariou, like those of Mount Somma, which are turned towards Mount Vesuvius. The Puy de Pariou was, in all probability, a volcanic cone formed within the larger crater by its last eruption of scoriæ. The formation of one volcanic cone within another is one of the most common phenomena in recent volcanoes, and many of the volcanic mountains in Auvergne appear to have been formed within larger craters, as will be noticed at the Puy de Chopine.

The annexed cut represents the external shape of the Puy de Pariou, and the dotted lines show the form and depth of the crater, the bottom of which *a a* is about three hundred and twenty feet below the highest part of the rim *c*. The current of lava *b b* seems to have issued from an opening on the north-east side of the present mountain. The dome-shaped mountain on the left is, I believe, called Sarcoui, but Sarcoui and Cliersou so nearly resemble each other, that it is difficult to distinguish them, and I omitted noting down the name on the spot.

The external shape of Pariou approaches to quadrilateral, or is that of a cone compressed on each side, and somewhat elongated from north to south. The crater,

which is circular, is flat at the bottom, as represented by the dotted line *a a*; there was a little water from the recent meltin of the snow remaining in some of the h lows, indeed we were told that we should find the crater filled with snow. The snow was gone, and grass was growing in some parts, others were covered with lo masses of scoriæ. About one-third do there is a projecting inner rim; it is probable that this was the bottom of the crater at one time, but it sunk down in a subsequent eruption. Owing to the great porosity of the soil, the crater of Pariou seems doomed to perpetual sterility, th be- is no tree or shrub within it, while rite Vesuvius, after a cessation of eruptions on only four centuries, was covered with large chesnut trees.

Nearly the whole of this mountain seems composed of scoriæ. On the top of the crater on the south, I saw some very light white pumice, but the greater part is a dark red scoria, with specular iron ore in its cells and fissures. Some contorted scoriæ near the summit contained augite; lower down I obtained dark scoriæ with adhering crystals of felspar partly fused, and

others in which the fusion was more perfect. Near la Barraque there were a number of en excavating the beds of lava for loose tone: I observed fiorite in some of the fissures, and many of the stones were tinged green, probably by copper.

From the summit of Pariou there is an extensive view to the east and north-east, over very fertile part of France: the view on the south is obstructed by the Puy de Dome. The cattle that pasture on these sterile mountains are driven home at night, and water is so scarce, that the peasants fetch it in barrels from the distance of a league, w for the cattle and for domestic use.

The present state of the crater of Pariou, and of the bed of lava that divides into two branches, and may be traced for several miles into the valley of Clermont, leave no room for doubt respecting the former activity of volcanic fire in this part of Auvergne. We have here a crater as perfect as that of any recent volcano, and most of the minerals of which the mountain and the lava from it are composed, are the same as those found in the lavas of Etna and Vesuvius, or those of the volcanoes in

the Lipari islands, or in Iceland. By the kindness of a friend, I received before leaving England, a cask filled with specimens of the lavas from all the most remarkable eruptions of Vesuvius, and with the exception of one mineral (leunite) peculiar to this volcano, all the others may be identified with the lavas, from what are considered the more recent volcanoes in Auvergne.

Though the evidence of the volcanic origin of the lavas in Auvergne is as strong and complete as it is possible to be, yet some English writers have affected to doubt the testimony of competent observers, because it tended to invalidate their favourite theories respecting the aqueous formation of basalt. For, in many instances, currents of undoubted lava are observed to pass by gradation into compact basalt, resembling, in all its characters, the basalt so abundantly occurring in the northern part of our own island; hence we are compelled to admit the former agency of subterranean fire in Britain, though we have no remaining vestiges of well characterised volcanoes. There are many parts of Au-

vergne also, where, though the rocks are evidently volcanic, there is no appearance whatever of a volcanic crater. This is the case particularly at Mont d'Or, and has very much perplexed geologists, but a little reflection would have removed the difficulty. The first breaking out of a volcano in a new situation, is not preceded by the formation of a crater; it is nothing more than a fissure or rent, which, if it be sufficiently wide, will admit the lava to flow freely, but if it be partially choked up, the open parts will become so many mouths, round which the ejected matter will accumulate. In this manner, nine volcanic hills were formed in one line on the side of Etna, along a fissure which became partially choked up during an eruption. In certain parts of Mont d'Or, where the occurrence of scoriæ on the surface indicates the intense action of volcanic fire, no trace of a crater can be observed, as Montlosier informs us, except a projecting vitrified knoll, which is imperforated. Here we may suppose that the matter was ejected from a fissure which terminated at this knoll, and that there had been only one eruption; for a succes-

sion of eruptions from the same opening must form a volcanic hill, with a crater. It ought always to be recollected, that the volcanic cone or mountain is not itself the seat of subterranean heat, or, in other words, it is not the furnace, but merely the chimney, through which the volatile and melted matter is ejected from an unknown depth. Nor is it formed by the first eruption, but by a succession of eruptions from the same aperture, when the rent or fissure is nearly closed. In England we have instances of fissures of great width and many miles in length, filled with basalt, which cut through the strata, but we have no decided volcanic crater.

In our second excursion to the volcanic mountains on the south-west of Clermont, we first visited *Montadoux*, a conical mountain, composed of volcanic tuffa, capped by a mass of basalt. The tuffa is very variable in quality; in some parts it is hard and porphyritic, with crystals of felspar; in others soft, containing balls of indurated and fine grained basalt: in some instances these balls of basalt appear to have run into irregular forms in a state of fusion, among the softer materials. The tuffa

nearest the basalt contains the greatest quantity of scoriaceous balls and masses, which increase till the whole becomes basalt. This indicates that the lower bed passes by gradation into basalt, and that the basalt and tuffa have a similar origin. It has been supposed by some who have visited Auvergne, that the tuffa is principally an alluvial deposition of rounded fragments of volcanic rocks, intermixed with sand and clay, but I think the whole is an original product, formed by an intermixture of lava, with an eruption of mud. The basalt is black, and extremely hard, resembling that of Arthur's Seat, near Edinburgh, but contains a larger portion of olivine. The basalt which covers Montadoux descends nearly half way down on the south-east; but whether it is in its original position, or has fallen from above, may be doubtful.

On a second visit to Montadoux, I examined the basalt and basaltic balls on the southern side: the tuffa contained distinct crystals of felspar, and some of the balls of basalt were very close grained, approaching to the quality of dark hornstone.

About two miles west of Montadoux,

there is a granitic mountain, called the *Puy de Charade*, covered with similar basalt to that on the top of Montadoux, but between Montadoux and the Puy de Charade, there is a mountain altogether of a different character, called *Gravenire*, from which currents of lava may be distinctly traced, and it is covered with volcanic slagg and scoriæ, as well characterised as what are found in the most recent lavas of Vesuvius.

Leaving Montadoux, before we gained the road that goes under the south side of Gravenire, we saw a number of scattered blocks of basalt, which were well defined pentagonal prisms. Rocks of basalt and scoriæ overhang the road in many parts; but in ascending westward, we came to rocks of granite, covered with basalt: this granite is seen forming the base of the *Puy de Charade*.

A peasant who was working in the fields, offered to conduct us to the summit of that mountain. The soil in the ploughed fields over which we passed, was full of broken crystals of felspar, from the decomposing granite that formed the substratum. Where the granite rock was seen *in situ* it was in

a mouldering state, and almost friable; in some parts the soil was covered with masses and balls of scoriæ. The northern and western sides of the summit of Charade are covered with columnar, or rather prismatic basalt. There is one detached group of large well defined columnar basalt, aggregated, and exactly similar in form to the group of columns on Cader Idris, of which an outline is given in my Introduction to Geology, taken with a camera lucida. The whole base of the Puy de Charade is granite. The summit of the Puy de Charade is separated from that of Gravenire by a small valley, or *col*, into which we descended, the quantity of scoriæ increasing as we approached Gravenire, and here and there basalt was seen apparently *in situ*.

From the southwestern side of the summit of Gravenire, a current of lava appears distinctly to have flowed down towards the Puy de Charade; its width is about 120 feet. We ascended Gravenire over the surface of this current, which is covered with masses of cellular lava and scoriæ, bent and contorted in every variety of form; in some parts twisted like ropes, in others

congealed into pear-shaped balls, that had evidently consolidated in the air, like the volcanic bombs from Vesuvius. They appeared nearly as fresh as the scoriæ from a recent eruption, and had they been found in a newly discovered island, they might have been taken for the products of a volcano at present in activity. The top of Gravenire is an oblong uneven plain, about two thousand yards in circuit; the inner escarpements are irregular and indistinct, but there are the remains of several small and shallow craters, some round, others oval, that were probably the openings through which the last eruptions from the summit issued. In this respect the summit of Gravenire resembles the volcanic plain, with small craters, described at the top of Etna, except that in the former the continued action of rains for many centuries, has rounded the asperities of the projecting masses of scoriæ, and the inner escarpements of the craters. The quantity of loose scoriæ on the top, and on the northern side of Gravenire, is immense: this side is very precipitous. On the side facing Clermont, there is a porous basaltic lava, which lower down becomes

very compact. We descended by this side of the mountain, and at the bottom we stopped to examine an extensive excavation made in a bed of black volcanic sand, which is used to mix with lime for mortar. This bed is composed of particles of black scoriæ, varying from the size of a small shot to that of a pea: it is at present excavated to the depth of about fifteen feet; how much deeper it may be is not ascertained. This volcanic sand, or powder, was quite dry and incoherent; it was covered by a bed of larger pieces of scoriæ and tuffa, and this again was covered by a thick stratum of vegetable soil. It is well known that during volcanic eruptions, the volcanic powders, or ashes, as they have been improperly called, are ejected to an amazing height, and often fall at a great distance from the volcano.

I observed no bitumen in the volcanic products of Gravenire. Underneath Gravenire, on the eastern side, there is a hollow space, more than two miles in circuit, surrounded by basaltic rocks, many of which have their escarpements facing the interior, and present the indications of an immense crater, probably of more ancient date than

Gravenire. From the summit of Gravenire there is a fine view of Mont d'Or; it was nearly covered with snow.

The peasant who conducted us to the top of the Puy de Charrade and Gravenire told me, that the mountains of Auvergne are much infested with wolves: he had once seen a flock of twelve. He rented his farm of a proprietor at Clermont, who received half the produce of every kind. The soil is dry and meagre; and owing to the porosity of the volcanic substratum, water is extremely scarce, nor could we procure any during the day for our horse.

A few miles south-west of the Puy de Charrade, there are three volcanic mountains, that closely join each other. The most remarkable of these is called the *Puy de Vache.* The crater is broken down on the southern side, from which the last current of lava it ejected appears to have flowed into the valley; it then turns eastward, and extends nearly three leagues. Other currents of lava, from volcanoes in the vicinity, appear to have united with this current. The Puy de Vache contains in the inside of its crater a quantity of white and very porous lava, which may

properly be called pumice: in this lava are disseminated laminæ of specular iron ore, the largest and most brilliant of any found in Auvergne.

From what may be seen of the volcanoes in Auvergne, and from descriptions of volcanoes in other countries, I think we are warranted in drawing the following conclusions respecting the external shape of their summits, and the internal form of the craters. Where the last eruption of a volcano consists of loose fragments and scoriæ, these fall round the mouth, and leave a regular crater in the form of a deep inverted cone, as at Pariou; but where a great eruption of lava takes place from the crater itself, the sides are more or less broken down, as at the *Puy de Vache.* Where there have been two or more openings ejecting lava, the summit of the mountain becomes elongated, and the form of the crater irregular, as at the Puy de Nugerre, which will be afterwards described. Where many volcanic openings break out almost close to each other, they destroy the conical form of the crater entirely, and the summit is broad, and broken by numerous hollows, as at Gravenire and Etna.

This I conceive to be the true cause of what has excited so much surprise in the former mountain; namely that it should so decidedly present the proofs of the intense action of fire on its summit, without the appearance of a regular crater.

I have already mentioned the volcanic tuffa at the Pont du Château; it is, I believe, considerably distant from any other volcanic rock. Of those which I examined, the nearest to it is the Puy de la Poix, about three miles east of Clermont, and about four miles from Pont du Château.

The *Puy de la Poix* is a small hill abounding in bitumen, or mineral pitch, from whence it takes its name. The bitumen, in warm weather, is constantly oozing from it, forming a current on the northern side, several yards broad. This hill does not rise more than fifty feet above the level of the plain or valley of Clermont, and is distant about one mile from a larger conical hill, composed nearly of the same substance, called the *Puy de Cruelle*. The occurrence of volcanic tuffa, in what are called the older volcanic rocks, at the bottom of the present valley of Clermont, proves that the valley or plain was excavated prior to

the deposition of the tuffa,—a fact which is not generally admitted. The Puy de la Poix, and the Puy de Cruelle, of which I shall afterwards speak, are probably the remains of a vast bed of tuffa, that has once filled up the valley of Clermont, either wholly or partially, to a great height. It would be difficult to explain the cause of the permanent transudation of so great a quantity of bitumen as that which flows from the small hill of the Puy de la Poix, unless we suppose it to be connected with some deep or distant source of that mineral; for we are warranted in supposing the tuffa to be several thousand years old, and its stock of bitumen must have been long since exhausted in the Puy de la Poix, unless it had been constantly renovated. In the more recent lavas of Auvergne, I believe there is no trace of bitumen. Among the minerals at the Puy de la Poix, I found,

Scoriaceous lava.
Chalcedony with asphalt.
Basaltic hornblende.
Whitish phonolite.
Darker ditto, passing into basalt.
Ditto, passing into pitchstone.
Stilbite.

The mass of the hill is composed of tuffa, with the above minerals, and is much impregnated with bitumen.

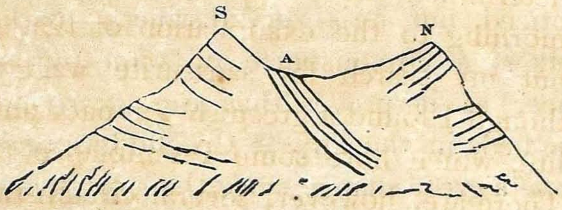
On returning from the Puy de la Poix, I saw upon the road a large fragment of a stone resembling *saussurite*, which was nearly sharp on the edges, and possessed the specific gravity and characters of that mineral, unmixed with any other substance. My guide, who was a collector of specimens, said it came from the Puy de Cruelle, which was not far distant; this determined me to devote the following morning to the examination of that hill, but my search for saussurite was vain, though I found a greenish compact phônolite, which bore some resemblance to it. There are, however, several circumstances respecting the Puy de Cruelle well deserving notice.

The Puy de Cruelle rises above the plain of Clermont about five hundred feet, in the form of a truncated cone: it is principally composed of beds of bituminous tuffa, consisting of fragments, in an earthy paste intermixed with bitumen. The bitumen is not so abundant as at Pont du Château, and at the Puy de la Poix. There are

other beds nearly compact, composed of a kind of clay-stone passing into phonolite of a greenish grey colour. The fresh water limestone may be seen round the bottom of the hill.

The most remarkable circumstance is the appearance of stratification in this hill, though the matter of which it is composed is volcanic.

The annexed cut represents a section of the Puy de Cruelle, taken from north to south:



At the southern side of the hill, the lower beds that are exposed are soft, and appear to be nearly horizontal; but on the summit they dip northwards, or to the centre of the hill. The beds on the northern and western side appear also to dip towards the centre of the hill. On the eastern side the summit slopes gently towards the plain.

Near the middle of the hill there is a ridge of stone of the same kind, but harder than the rest, which cuts across the hill from east to west, rising above the surface and dipping down to the north, as in the annexed figure. N. S. represent the north and south points of the summit, and A. the ridge which appears to intersect the hill like a dyke. Between the southern end S. and the ridge or dyke, there is a considerable depression.

I am not aware that the arrangement of the strata in this hill has been before noticed, but it is very distinctly marked, and is a circumstance of some importance, as it proves that the position of the beds in the Puy de Cruelle has undergone a great change since their original deposition; and if this be admitted, we cannot hesitate in admitting also that similar changes may have taken place, in other volcanic mountains in this district, whose present position has greatly perplexed geologists. The appearance of stratification is not uncommon in volcanic rocks, and may sometimes arise from the change of temperature in cooling, producing regular fissures resembling strata; but the tuffaceous

or brecciated matter of the Puy de Cruelle, was probably deposited by an aqueous eruption of different layers, covering each other in succession at short intervals. The dip of the beds towards the centre of the hill, would admit of a natural explanation by a sudden subsidence of the ground in that part, a subsidence which might well take place in a country rendered cavernous by the ejection of so much volcanic matter.

But a more important enquiry presents itself. If the Puy de Cruelle be the remains of a larger bed of volcanic tuffa, once connected with the tuffa in mountains to the west, has it been detached by the erosion of water; or by some elevating force acting from beneath; or by the subsidence of the surrounding mass, which has left this hill, with its strata, much shattered, but still retaining their original elevation? Dr. Daubenny, in the fourth volume of the Edinburgh Phil. Journal, states, that the limestone on which this rock appears to rest, sends up processes into the volcanic matter, and that isolated masses of limestone are found in the volcanic rock. I did not observe these processes, as my attention was more occupied with the

upper than the lower part of the hill; but as the strata have evidently been much disturbed since their original formation, their intermixture with the limestone may admit of a satisfactory explanation. If the harder bed, which resembles a dyke, was formed by subterranean fire, filling up a fissure in the hill, it might also force up portions of the subjacent limestone.

Whatever opinion we adopt, the present position of the beds in the Puy de Cruelle incontestibly proves that they have been subjected to some more powerful agency than the gradual erosion of water, and we gain a knowledge of one important fact, namely, that after the more ancient volcanic rocks of this district were formed, they have been more or less changed in position; a change which probably took place at the epoch that immediately preceded the eruption of the more recent volcanoes. The labour of fifty men, employed in clearin away the débris in some of these mountains, and ascertaining the exact line of junction of the granite, and the older volcanic rocks, and also of the limestone with these rocks, would do more to decide the doubtful points in the geology of Auvergne,

than volumes of the most elaborate reasoning.

In the Puy de Cruelle, the bed of volcanic tuffa is not covered by basalt as at Montadoux, Gergovia, Canturges, and other mountains round the plain of Clermont; this constitutes the principal difference between them. It is also more completely insulated: the geological position of this hill is represented by that of the lowest mountain on the right hand in the section (page 298).

The volcanic tuffa intermixed with bitumen is in some parts of Auvergne more than three hundred feet in depth, and bears the evident marks of being the product of an aqueous or muddy eruption, intermixed with an eruption of lava and scoriæ, which increased and covered the tuffa with compact lava or basalt. Where I had the opportunity of examining the tuffa near its junction with basalt, I observed that the quantity of the basaltic masses in the tuffa increased as it approached the basalt; until the whole formed a mass of compact basalt, but more or less intermixed with scoriæ. The earthy base of the tuffa, and its intermixture with bitumen, indicate that it was ejected in a state of mud, and that the

water prevented the ignition of the bituminous matter, while the intermixture of scoriæ and irregular masses of basalt, which appears to have congealed from a state of fusion, indicate that igneous eruptions were ejected at the same time; and as the lava covers the tuffa, we may hence conclude that the igneous eruptions were continued a considerable time after the muddy eruptions had ceased.

That the beds of tuffa, as well as the other rocks of Auvergne, have in many parts been deeply excavated by deluges or torrents is very evident; we cannot, therefore, be surprised that in some situations tuffa should be found transported from its original position, and intermixed with rounded fragments of older rocks. This has made some observers suppose, that all the beds of tuffa were merely depositions of the detritus of rocks that had been transported by water, and intermixed with sand and clay. On the contrary, there is every appearance that the beds of tuffa or breccia round Clermont, are original volcanic depositions.

Gergovia is about three miles south of Clermont: it is said to rise 180 toises, or

1152 feet above the plain. It is a table mountain nearly flat at the top, the length from east to west at the summit rather exceeds one mile, and its breadth from north to south is about four or five hundred yards. The ancient town of Gergovia, so celebrated for its resistance to Cæsar, is supposed to have stood near the western end. The foundations of buildings are discovered by digging, and antique vessels are occasionally found. The whole of the summit is cultivated, for though it is composed of basalt, it is covered with a good vegetable soil. In the ploughed ground, I observed fragments of pitch stone, and rounded pebbles of greasy quartz. The basalt of Gergovia rests on volcanic tuffa, which appears much decomposed where it is exposed. In the tuffa, I observed rounded masses of reddish compact phonolite; but I do not consider the tuffa of Gergovia to be (as M. Montlosier supposes) an alluvial bed of sediment and water-worn fragments, deposited at the bottom of an ancient valley. Its position is at least five hundred feet above the vale of Clermont, and it appears to rest on fresh water limestone, and marl.

The fresh water limestone, where it is quarried above the village of Romagnat, is very regularly interstratified with thin beds of argillaceous stone, and is nearly horizontal. The first day I was there, I discovered in two of the beds several bones, which, as I have before stated, are similar in appearance to those in the Paris basin, and evidently belong to similar genera of mammalia. The men told me that the galleries cut in the limestone were carried to the distance of one-third of a league under Gergovia; but on my second visit, I procured candles, and penetrated as far as it had been worked, which I found to be but a very short distance from the entrance.

I have before expressed some doubt whether the limestone passes under Gergovia, or is merely covered to a certain extent by tuffa which has fallen upon it. Appearances are in favour of the former opinion, as the limestone may be traced nearly round the hill. The basalt which covers this mountain was once connected with a larger bed of basalt: this cannot be doubted; nor would its separation by the action of water be more remarkable than that of the insulated caps of sandstone or

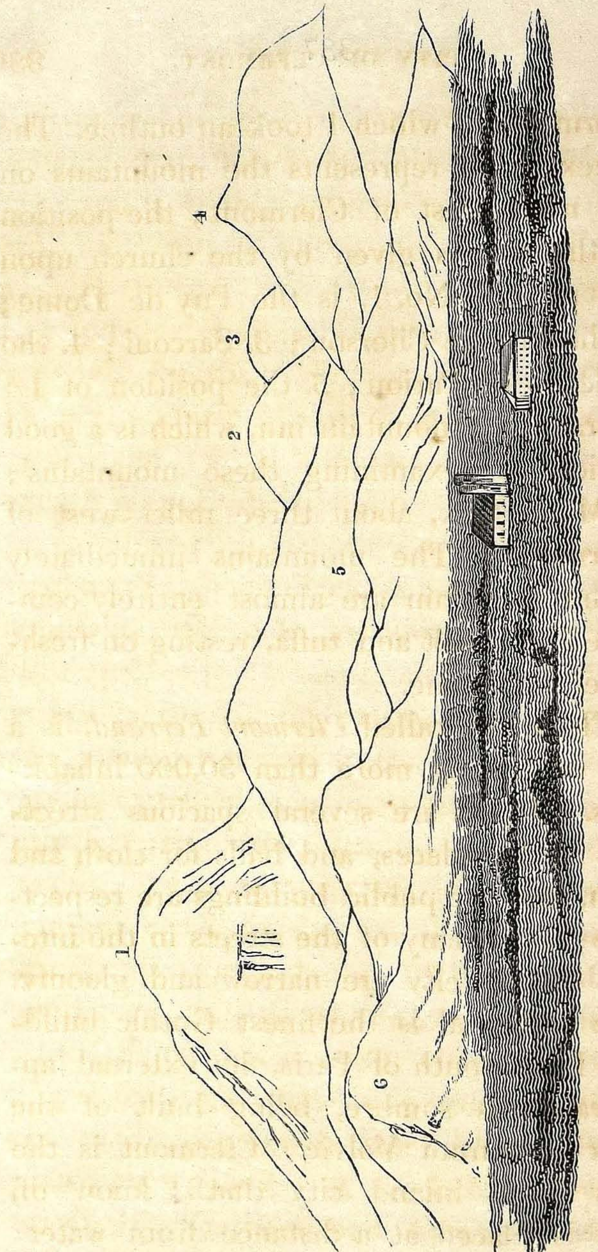
limestone on some of our English mountains, provincially called Hummocks, which are evidently the remaining portions of a large stratum that has been cut through either by the continued action of water-courses, or by some sudden and mighty deluge, that has swept over the globe, and furrowed its surface into valleys. In Auvergne, however, where the agency of another cause, volcanic fire, is clearly apparent in an extent of many hundred square miles, we may doubt whether many of the isolated masses of basalt on the summits of the mountains have not been detached by the subsidence or partial elevation of the ground, during the great convulsions which it has experienced. An accurate survey of the country, with correct sections through different parts, and occasional excavations below the surface, is wanting to complete our knowledge of the geology of this country, particularly of certain interesting positions, which I shall mention in the following chapter.

It may be useful to recall the attention of the reader to the geological position of the mountains mentioned or described in the present chapter, by a reference to the

section given (page 298). In this section it is not attempted to preserve the form of the outline, or the relative distances.

The position of the Puy de Cruelle, composed of tuffa resting upon the fresh-water limestone, is represented by the lowest mountain on the right. Gergovia, composed of tuffa and basalt, is represented by the mountain next to it (D). The structure and position of many of the mountains round Clermont, viz. Cotes, Chanturges, &c. are precisely similar to this. The second mountain, marked D, represents nearly the position of Montadoux; and the third, marked D, the Puy de Charrade; but in the latter mountain part of the basalt appears to rest upon granite. The mountain E, formed of trachyte, represents the position of the Puy de Dome, and the other mountains composed of trachyte. Two volcanic mountains are seen behind, F F. The first may represent the Puy de Gravenire, the second the Puy de Vache or the Puy de Pariou, and the other volcanoes of this district, from which currents of lava descend into the valleys.

From the Pay de Cruelle there is a very extensive view of the mountains round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Clermont, of which I took an outline. The annexed cut represents the mountains on the north-west of Clermont; the position of the city is given by the church upon the plain. No. 1. is the Puy de Dome; 2. the Puy de Clierson; 3. Sarcoui; 4. the Volcano of Pariou; 5. the position of La Barraque, a mountain inn, which is a good station for examining these mountains; 6. Montadoux, about three miles west of Clermont. The mountains immediately round the plain are almost entirely composed of basalt and tuffa, resting on fresh-water limestone.

Clermont, called *Clermont Ferrand*, is a city containing more than 30,000 inhabitants. There are several spacious streets and market-places, and halls for cloth and corn, and the public buildings are respectable; but many of the streets in the interior of the city are narrow and gloomy. The cathedral is the finest Gothic building I saw south of Paris, its external appearance is sombre, being built of the dark lava from Volvic. Clermont is the only large inland city that I know of, that is placed at a distance from water: there is only one miserable brook, which

I could stride over; but it was then a dry season. This brook is used for washing, and affords but a scanty supply for that purpose. Water of a good quality is brought by aqueducts from Royal, about two miles distant, at the foot of the volcanic mountains, and is distributed to several public fountains in the city. One of these fountains is in the centre of the Grand Place; it is built in the richly ornamented Gothic style, and is extremely light and beautiful. There are twenty-four *jets d'eau* in constant activity. It was erected in 1511.

The plain in which Clermont is situated, called the *Limagne d'Auvergne*, is the richest soil in France: provisions are good and plentiful. The seasons are later than at Lyons, but the beans were in flower on the 30th of April, and the sheep are generally shorn the beginning of May. Many of the families in the lower or middle rank of life have small vineyards, and make wine for their own consumption: these vineyards are in the immediate vicinity of Clermont. A freehold vineyard, which cost two hundred francs, or about eight pounds sterling, produced wine more

than sufficient for a family of five persons, as we were informed by one of these little proprietors. They cultivate the vineyards themselves. The wine made here is red; some of it is of a very good quality.

The Soleil d'Or, in Clermont, was the only place in France where we had a dish of fried frogs sent to the table; but it was not for want of provisions, for they were served up as a *bonne bouche*, after a great number of other dishes. The table was always well supplied, and our host and family were obliging; but there was less attention to comfort in the apartments, than is agreeable to an Englishman's habits.

One English family has resided at Clermont several years, and the younger branches have intermarried with the natives. I had little opportunity of judging of the state of society, my time being almost entirely occupied in excursing among the mountains. A French nobleman, Le Baron de Sonnatte, hearing that there was an Englishman engaged in examining the country, politely sent to inform me, that he was confined to his room by indisposition, and could not call upon

me, but should be happy to see me at his house: he was writing a history of Auvergne. I accepted the invitation, and found him in bed: his conversation was very animated and full of anecdote: his own pursuits were history and antiquities. On departing, he pressed me, with much courtesy, to consider his library as my own while I remained at Clermont.

The Abbé Lacoste, Professor of Natural Philosophy in the Royal College at Clermont, has a large collection of valuable specimens from Auvergne. He has written a natural history of Auvergne, and several tracts on agriculture, &c. Though now far advanced in life, he retains some remains of his former fire and gaiety. He called regularly every evening, to enquire the course of my excursions. On retiring, we had always a most ceremonious contest in the corridor: the old gentleman objecting, with fifty bows, to my accompanying him down stairs; and though he had taken leave of Mrs. B. with all due form but an instant before, he never failed to finish a most profound reverence with "*Presentez mes respects à Madame.*" This overcharged

politesse of the old school was a severe trial to my gravity.

There were about 4000 cavalry at Clermont: they received orders to proceed towards Spain when we were there. One day I dined with some of the officers: they did not seem to approve of a war with Spain, but they said the French soldiers think but little about the object of the war, when the enemy is before them; and in case a war took place, they calculated much on the assistance of those traitors, (*coquins*,) many of whom, in every country, were ready to join the invaders, for their own interest. Some of the measures of the French government which appeared arbitrary were alluded to, and one of the officers remarked, that such acts were indications, not of the strength, but of the weakness of a government. Both the officers and privates were strong soldier-like looking men, and well equipped. The price of the *table d'hôte* was three francs, with an unlimited quantity of very good wine, which I observed the officers did not spare.

A considerable quantity of coarse woollens and serges, and also of ribbands and silk

hose, are manufactured at Clermont. Wood for fuel is scarce and dear; the land of the Limagne is too rich and valuable to be covered with forests, and the volcanic mountains on the west are too arid and sterile to admit the growth of timber, or any thing much larger than brush-wood.

CHAP. IX.

CLERMONT TO RIOM. — LAVA OF VOLVIC. — VOLCANO AND CRATER OF NUGERRE. — OBSERVATIONS ON ITS INTERNAL FORM. — ON THE GRANITE IN WHICH THE VOLCANOES OF AUVERGNE ARE PLACED. — EXCURSION TO THE PUY DE CHOPINE. — A THUNDER-STORM ON THE MOUNTAINS. — A GENERAL VIEW OF CERTAIN VOLCANIC MOUNTAINS CONNECTED WITH THE PUY DE CHOPINE. — OPINIONS OF SEVERAL GEOLOGISTS RESPECTING THEM. — PUY DE CHOPINE, A MOUNTAIN PARTLY COMPOSED OF GRANITE AND PARTLY OF VOLCANIC MATTER, PLACED WITHIN A LARGE CRATER. — VOLCANIC MOUNTAINS SOUTH OF CLERMONT; THEIR SIMILARITY TO ROCKS REGARDED AS PRIMITIVE. — ON THE PROBABILITY OF FUTURE VOLCANIC ERUPTIONS IN AUVERGNE.

CATHOLIC MISSIONARIES IN FRANCE. — RIOM TO PARIS. — MOULINS. — NEVERS. — MONTARGIS. — FONTAINBLEAU. — PORCELAIN MANUFACTURE OF SEVES. — FUNERAL OF THE ABBE HAUY.

After leaving Clermont we proceeded to Riom, situated eight miles north of the

former city. At Riom we remained a few days, as it is a convenient station for examining some of the most northern volcanic mountains. This town contains thirteen thousand inhabitants; it is the residence of a great number of lawyers: courts of justice for the department are held here, and there is a large prison conducted on Howard's plan, with separate cells for solitary imprisonment. An order had been sent from the government, a few weeks before we were at Riom, to prohibit strangers from visiting the prison. I understood that several persons were confined here for political offences. On the outside of the town there are handsome promenades, planted with rows of trees, which give an agreeable appearance to the place when seen from the rich plain, *the Limagne D'Auvergne,* that extends beneath Riom on the east, but the interior of the town is dull and sombre.

The following morning a drive of about an hour westward, brought us to the feet of the most northern volcanic mountains of Auvergne. We passed by the ruins of the ancient castle of Volvic, situated on a commanding eminence on the right of the

road, and entered the large village of Volvic, celebrated for its extensive quarries. These quarries are excavated in one of the most remarkable currents of lava in this country: its course, from the mouth of the crater of the *Puy de Nugerre* to its termination in the valley, may be traced without interruption for about three miles, as distinctly as if it had been a torrent of water suddenly converted into ice. The road from Volvic to the Puy de Nugerre ascends along a narrow valley, bounded by low granitic mountains, that slope down on each side towards it, forming a deep trough, the bottom of which is filled to a great height, with the lava that rolled from the volcano of Nugerre in one continued stream. The lava does not lie flat in the valley, but the middle of the current is considerably higher than the sides. The surface is rough and broken; one mass of stone projecting over another, as if they had been consolidated and propelled forward at the same time. Near the top of the current are several small caverns, in which flakes of lava may be seen hanging from the roof, which had evidently become congealed in descending. The breadth of the current

above the village of Volvic, may be from 300 to 400 yards, but it spreads out much wider below. The stone near the surface is rough and cellular; a few feet below, it becomes apparently compact, but is full of very minute pores. In many parts the lava contains laminæ of specular iron ore in great abundance; it contains also irregular nodules, and plates of quartz: its colour is a very dark grey, and its general appearance is exactly similar to some of the modern dark grey lavas from Vesuvius. The stone divides into irregular prisms, which are raised for building-stone; it is almost the only stone employed for the purpose in this part of France, and is both light and durable. There is another use to which it has been recently applied; it is cut into pieces, from five to eight feet in length, and about one foot in diameter, which are bored for water pipes, and sent to Paris. Its extreme hardness, tenacity, and durability, render it well suited to this purpose, the pores being too minute to admit the escape of water.

We ascended more than a mile along the side of a granitic mountain: the road runs for a considerable distance immediately

above the lava, but in some parts comes close to it, and I could place one foot on the bare granite, and the other upon the side of the current of lava. I was desirous to see the effect of the contact, and what change was produced in the granite by its proximity to such a mass of volcanic matter in fusion; but its surface was so much decomposed, that it would require a deep excavation to be made, to ascertain whether the granite had been partially fused, or in any degree affected by heat.

In ascending the valley, and observing the granitic rocks on each side of it, and the dark mass of stone filling up the bottom, it would scarcely be possible for any one, however unacquainted with geological phænomena, to avoid inquiring how the latter came to be thrown between rocks so dissimilar to it in appearance. Higher up there is an insulated hill of granite, surrounded by lava: it is evident that this hill had opposed a barrier to the descending current, until the lava accumulated to a considerable height, and divided in two streams, which united again below.

When we had arrived at the elevated plain above the valley, we turned to the

right, and ascended a mountain, on the sides of which the same current of lava was continued: this is the *Puy de Nugerre.*

The crater is of great extent and depth, and is elongated. The violence of the last eruption which threw out the lava of Volvic, has broken down the eastern side, by which we entered it. Within this crater there is a hill of lava, about thirty or forty yards in height, which appears to be placed over the mouth, through which the latter part of the eruption was made, the lava congealing and accumulating round it, until it ceased to be ejected. To this inner hill part of the lava of Volvic may be traced. On climbing the sides of the crater, I perceived that there were two other craters, one on the north, separated from the larger crater by a semicircular ridge of scoriæ of great height, and another on the the west, separated by a lower ridge. The lava has flowed down three sides of the mountain, but the different streams united at the base, and as the quality of the lava is similar, we may conclude that the eruption from each crater was simultaneous. Indeed, it is highly probable that these craters were united in one, but were separated by

a shower of scoriæ, which fell within it, and formed the lofty ridges at present remaining. The western side, or rim of the crater of Nugerre, is the highest. There is much scoriæ within the crater, but it was not contorted into different singular forms, like that of Gravenire. I also found, near the summit, very compact black basalt, resembling the most compact Rowley ragg; though there is no appearance of similar basalt in the great stream of lava descending to Volvic.

From the present state of the crater of Nugerre, and of the lava and scoriæ, we may, I think, infer, that there has been at least more than one eruption, and that the lava of Volvic was ejected during the last, at which period the sides of the crater already formed were broken. Craters that have a regular conical form are chiefly composed of scoriæ and pumice that have fallen around the opening through which they were ejected; and if they retain their regularity of form, we may be assured that no considerable eruption of lava has taken place from the summit of the mountain since their formation, for such an eruption would have broken down the sides of the

crater, more or less. In lofty volcanoes, which have a conical summit, we find that the greatest eruptions of lava are almost always from the flanks of the mountain. Whenever the lava rises nearly to the top of the cone, and is discharged in a considerable quantity, one side of the crater must yield to the force of the current. That this has been the case at Nugerre, cannot, I think, be doubted.

At Gravenire a number of volcanic openings, near to each other, appear to have prevented the formation of a regular cone, as I have before observed; whereas at Pariou no eruption of lava can have taken place, from its regularly formed crater, the current which descended having burst out from the flanks of the volcano.

From the homogeneous nature of the lava which descends from the Puy de Nugerre to Volvic, and from every appearance respecting it, we may conclude that this lava was all ejected during the same eruption; while the different nature of the volcanic matter which forms the crater of the Puy de Nugerre leads to the inference, that it was ejected during a different or a prior eruption. In the Puy de Nugerre

we have a satisfactory proof of a volcano breaking out through beds of granite, a fact altogether at variance with the theory of Werner.

At a little distance from the Puy de Nugerre is the volcano of Jumes, the crater of which is of immense size, and the most perfect in Auvergne, except that of the Puy de Pariou before described. Farther west are the *Puy de Chopine, le Sarcoui,* and several volcanic mountains without any existing craters, and composed of mineral substances altogether different from those of the Puy de Nugerre.

These volcanoes and volcanic mountains being placed on an elevated granitic plain, as I have before stated, the nature of the granitic rocks must be worthy of some attention. I had a very good opportunity of examining them on my descent to Volvic, as the road had been recently cut out, and fresh sections of the rocks were laid bare.

The granite was distinctly divided into beds, and these beds were again subdivided into prismatic forms, like beds of basalt. The granite, like that of the Forez, was principally composed of felspar, but alter-

nated with beds of syenite, and with a compact greenish chloritic bed, and also with another rock closely resembling basalt, probably an intermixture of hornblende and felspar. This latter rock alternated several times with thegranite, and bore so close a resemblance to some of the volcanic rocks of this district, that our guide, who made some pretensions to be a mineralogist, pronounced it to be lava when I showed it to him. The granite was covered with a stratum of black volcanic sand, which had probably lain there undisturbed since the period of its ejection: this volcanic sand was covered with common sand, and vegetable mould. Before arriving at Volvic, we stopped to examine one of the quarries in the lava. It is excavated under the surface, forming a vast cavern or gallery, which we were told extended nearly half a league: it is about fifty yards wide, and is lighted by apertures cut through to the day. The width of the current of lava may be here about three hundred yards: it fills up the bottom of a narrow defile between rocks of granite, and extends to a great depth, as appears from some quarries which are lower down than the great quarry; the northern

side of the current is too scoriaceous to be workable. Below Volvic, the lava enters into the open country, and spreads out to the breadth of three quarters of a mile. It may be traced as far as St. Genest, where it terminates. The spring which supplies the town of Riom with water, rises up at this place in an abundant stream, and is conducted by a canal or aqueduct to Riom. The water is very clear, having percolated through the lava.

The surface and fissures of the lava of Volvic are in many parts covered with brilliant laminæ of specular iron ore, which are larger than any I have seen in the lavas from Vesuvius, but not so large as in the lava of the Puy de Vache, south-west of Clermont, or in the lavas from Stromboli. It has been ascertained, by observations on active volcanoes, that these metallic crystals are formed by sublimation, the great heat raising the metallic matter in a state of vapour, which condenses and crystallises in cooling.

The day after we had been to the Puy de Nugerre, we started early from Riom, to visit the *Puy de Chopine*, passing through Volvic, where we had engaged an old man,

who acts as guide, to accompany us. We ascended from Volvic by the same road we had passed the preceding day, but we afterwards left the volcano of Nugerre on our right, and travelled over a barren heath covered in many parts with the remains of ancient currents of lava. We had proceeded about four miles from Volvic, when I saw a small black cloud in the west, which I noticed as indicating the probability of a change of weather in the evening; but in the course of an hour, just as we arrived near the foot of the Puy de Chopine, the heavens were suddenly overcast, and we were involved in a gloom, as dark and dense as that of a November sky in London. I descended from the char, and walked with the guide towards the mountain, but I had not gone far, when a stream of electric fire, darting in three forked lines, struck the earth at some distance from us, and was followed by three distinct reports in rapid succession, like the firing of three mortars. The guide said he thought we might venture to proceed; but we had scarcely advanced twenty yards further, when he was struck with terror by a deep rushing sound like that of a num-

ber of water-mills set in sudden motion: crying out, " *Vite, vite,*" he ran back in great consternation towards the patache. I could not make him stop to explain the cause of his alarm, but we had scarcely got under the cover of our vehicle, when the hail fell in pieces as large as bullets, and the lightning struck the ground almost close to us, and was followed by a report like that of a thousand crackers. The difference in the sound of this and of the preceding discharge may, I think, be satisfactorily explained. In the first instance, the lightning formed three zigzag lines, at some distance from where we stood, the report from each of these lines came in succession upon the ear, like three distinct discharges; but, in the latter case, the lightning struck the earth so near to us, that every little undulation in its course was heard in succession. The effect was similar to that produced when standing at one end of a long line of soldiers who are firing together; though they may all fire at the same moment, the sound from each piece comes to the ear with a little interval between; whereas, a person standing at some distance in front, hears only the discharge

from the whole as one sound. The storm continued for nearly two hours, and I was apprehensive that the object of my journey would be defeated; but it abated in time to allow me to make a complete circuit of the Puy de Chopine, and examine it on every side, though in a more rapid manner than I had intended. These hailstorms, so frequent in the interior of France, are the greatest evil which the farmer has to apprehend, often destroying his crops, and sometimes the cattle also. This storm did not reach the plain at Riom, as the hail was thawed in falling through the lower and warmer atmosphere.

Previously to a description of the Puy de Chopine, it may be proper to state the circumstances which render this mountain so interesting to geologists. Beside the mountains in Auvergne, which have the remains of craters, and are covered with scoriæ and lava; and beside the beds of basaltic tuffa before described, there are other mountains which preserve no appearance of craters, and which are composed of a rock that bears little resemblance to the common products of volcanoes. This rock, when in its most compact state, might

be called a porphyry: in its composition and character it is similar to some of the light-coloured porphyry or elvar of Cornwall, and would not be suspected to have an igneous origin. Its prevailing colours are whitish or yellowish brown, and grey; it is sometimes compact, but has more frequently a coarse earthy texture, and is devoid of lustre: it contains crystals of vitreous felspar. The base or paste of which this rock is composed is also felspar, but is sometimes in an earthy or friable state. Before the blowpipe it melts into an enamel. To this rock, from its rough earthy texture, the French mineralogists have given the name of *trachyte.** A variety of it has been called *domite*, but the latter name is now abandoned, as unappropriate and useless. Mountains of trachyte have generally rounded or dome-shaped summits. If they were not placed among other mountains decidedly volcanic, there is often nothing in their appearance which could in-

* Trachyte, from the Greek τϱαχὺς, rough. Beside crystals of felspar, which are essential, other crystals occasionally occur, particularly acicular crystals of hornblende, hexagonal crystals of mica, specular iron ore, sphène, and augite. The latter mineral is rare.

duce the observer to suspect that they had ever been subjected to the action of fire; but a more attentive inspection will prove that they are intimately connected with volcanic rocks. The principal mountains of this class near Clermont and Riom, are the Puy de Dome, the mountains called the Greater and Lesser Cliersou, the Puy de Sarcoui, and the Puy de Chopine; but there is some difference in the quality of the rock, and in the attendant circumstances of each, well deserving attention. The rock of which the Puy de Dome is chiefly composed is a whitish-brown; besides crystals of vitreous felspar, it contains also small hexagonal laminæ of mica; acicular crystals of hornblende; and crystals of specular iron ore in its fissures, in which sulphur is also sometimes found. Near the base, or rather upon the base of this mountain, on the north side, it appears that a small volcano has broken out, and covered it with scoriæ and fragments of lava: this crater, though small, is well formed, and is called *le Nid de Poule*, or the hen's nest. The mountains of the great and little Cliersou, are composed of a nearly similar rock to that of the

Puy de Dome, but more coarse and earthy in its texture; the little Cliersou joins, at one end, a volcanic mountain called the Puy de Laumone. The Great Cliersou appears detached and nearly spherical. This mountain is penetrated by several galleries, which were formerly quarries, the stone having been used for sarcophagi. What is truly remarkable; in these excavations may be seen fragments of scoriæ and dark lava imbedded in the light-grey trachyte. Similar fragments of lava are also found in the trachyte of the Puy de Dome and the Little Cliersou. Now it appears evident that the trachyte must have been in a fluid state when it was penetrated by these fragments of scoriæ and lava, and this fact alone seems sufficient to decide the volcanic nature of this rock; but there are other corroborative circumstances which I shall mention. The Puy de Sarcoui, which is a rock similar in composition, but more light and spongy, was formerly used for coffins and sarcophagi, on account of its absorbent qualities; this rock also incloses fragments of lava, and may be regarded as a species of pumice. In some parts it presents stripes of a lemon-yellow colour:

this yellow stone, of which I got specimens, yields a smell of muriatic acid, when rubbed, and has been proved by M. Vauquelin to contain that acid. The summit of the Great Cliersou, to a small depth under the surface, is also composed of a spongy pumice. In many of the mountains in Auvergne, the trachyte may be seen passing into the state of cellular lava, more or less vitrified, and the crystals of felspar in it are partly melted and reduced to a frit. These facts appear sufficient to prove the volcanic nature of trachyte, but if other facts are wanting, a similar rock in the Lipari islands is described by Dolomieu, under the name of *lave petro siliceuse*, where it has evidently flowed as lava. Granting, as we must do, the volcanic nature of trachyte, an interesting question suggests itself: by what means have the detached and rounded mountains, composed of this mineral, been placed in their present situation, upon a soil to which they seem foreign? Some of these mountains are of vast size, yet they present no crater nor aperture through which the matter has been ejected. Various conjectures have been formed by geologists, respecting the tra-

chytic mountains of Auvergne; some have regarded them as masses of granite heated *in situ*. Saussure regards them as porphyry, slightly calcined by subterranean fire; others suppose that they have been raised up in the state in which we see them. Montlosier considers them as formed by the ejection of an immense quantity of pumice, that has fallen in heaps and consolidated. Von Buch supposes that they are masses of granite which have been raised by subterranean fire, and have been changed into trachyte, and porphyry, by the action of elastic vapours; while D'Aubuisson considers these mountains of trachyte to be only the remains of a great bed of this mineral, that once covered the country. Certain geologists are very reluctant to admit that these rocks are volcanic, for they appear to be so intimately connected with rocks of granite and porphyry, called primitive, that it would be difficult to deny that they had all one common origin; and if this were established, their favourite theories would be no longer tenable.* Dr.

* It is amusing to see the alarm which Mon. A. H. de Bonnard evinces on this subject, in his *Apperçu Geognostique des Terrains*, "Un autre genre des difficultés

Daubenny supposes the trachyte mountains in Auvergne to have been produced by eruptions of volcanic mud. *Edin. Phil. Journal*, vol. iv.

With reference to these geological enquiries, the examination of the Puy de Chopine becomes extremely interesting. This mountain, as nearly as I could estimate, rises to the height of about nine hundred feet above the elevated plain on the west of Riom: its sides are broken and precipitous. The Puy de Chopine is partly surrounded at its base by the escarpements of a large volcanic crater; they form

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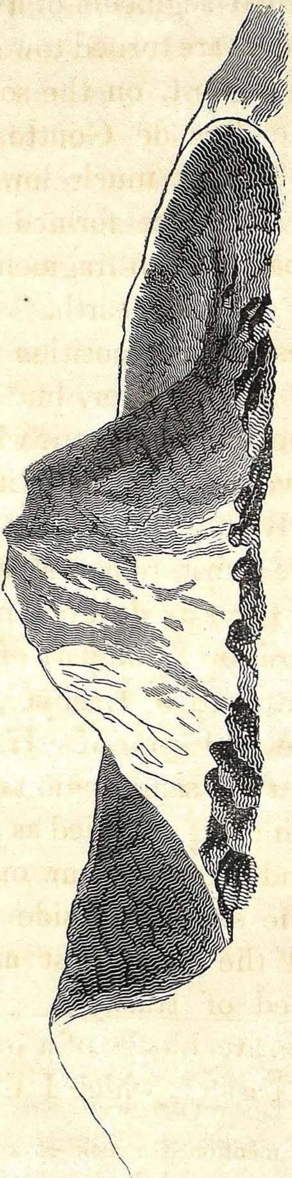
doit nécessairement arrêter tout esprit sage qui seroit tenté de chercher à expliquer l'existence des terrains de trachyte, par le developpement d'une hypothèse quelconque fondeé sur l'action des volcans: C'EST L'ETENDUE DES CONSEQUENCES QU'ON POURROIT TIRER DE CETTE EXPLICATION, relativement à d'autres terrains, regardés jusqu'à présent comme d'un ordre bien différent. Sans doute, dans certaines localités, les trachytes paroissent porter l'empreinte évidente de l'action de feu: mais des terrains semblables se retrouvent aussi dans des localités où l'action des volcans n'a jamais été supçonnée." On such a subject it would have shown a more philosophic temper, or what M. Bonnard calls "*l'esprit sage*," to have said, let us yield to the evidence which nature presents to us, and leave consequences and theories to take care of themselves.



two detached segments of a circle. These escarpements are turned towards the mountain: the highest, on the southern side, is called the Puy de Goutte; that on the northern side is much lower, but is very distinct. They are formed of scoriaceous and compact lava in fragments, intermixed with red ochrous earth. The annexed cut represents the position of the Puy de Chopine, in the crater, but as this station was too near to take in the whole mountain, I have given the outline of it, which I took north of Riom.

But the most remarkable circumstance attending the Puy de Chopine, is its singular composition; one part of the mountain being composed of trachyte, and the other of granite and syenite. Here we have a mixture in the same mountain of volcanic rocks, with rocks regarded as primitive. The granite and syenite occur on the east, and part of the south-east side of the mountain, and the south-west and north-west are formed of trachyte. On the north side there are blocks of a rock that much resemble basalt*, which I thought I could

* I have mentioned a rock of a similar kind, imbedded in granite, and alternating with it near the road

trace to near the summit, from which the blocks had fallen down. Owing to the storm, I had not time to examine it as long as I could have wished; but from what I saw I am inclined to believe, that a dyke of this substance intersects the northern side of the Puy de Chopine, running between the trachyte and the granite. On the other side, I could trace no separation between these rocks, and in some parts of the mountain the trachyte and granite seem confusedly mixed together.

The trachyte of the Puy de Chopine differs in no respect from many of the harder varieties of trachyte in other parts of Auvergne; on attentively examining it, I found it contained small laminæ of specular iron ore, but they are not so abundantly disseminated as at the Puy de Dome; yet I brought away several specimens, in which they are very distinct. I mention this circumstance, because M. Montlosier

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side in ascending from Volvic. Some of the French geologists will not allow rocks composed of horneblende and felspar, however intimately combined, to be classed with basalt.

seems to regard the Puy de Chopine as a different rock from that of the Puy de Dome. The granite of the Puy de Chopine partakes of the same character as the other granitic rocks in this district, and the mountains of the Forez, being soft at the surface, and much disposed to disintegrate. Part of it is a syenite, composed, principally of red crystals of felspar and hornblende; in other parts, the hornblende increases so much as to form a rock approaching to basalt in appearance, as I have before mentioned; while in certain parts of the hill the granite is grey and small-grained, abounding in mica. Now these are also the characters of the granitic rocks of this country: in several situations where I observed them, the quantity of quartz which they contained was so very trifling, that it could not be estimated at more than one-tenth part of the mass.

This singular intermixture of volcanic rocks with granite, syenite, and hornblende-rock, placed within the segments of a crater composed of scoriæ and lava, seems to indicate that the Puy de Chopine had been raised by the expansive force of subterranean fire, through an opening, or crater,

already formed; and that theheat had only partially acted upon the mass, leaving part of the granite and syenite unchanged, in the same manner as rocks, unaltered by fire, are sometimes ejected from active volcanoes.

I do not conceive that any other explanation of the formation of the Puy de Chopine can be given that shall preserve an appearance of probability. Sufficient attention has not, I think, been paid to the granitic rocks of this district, otherwise it would have been seen, that they afford the materials for all the volcanic rocks in Auvergne, and particularly for the trachyte. The great beds of granite, composed almost exclusively of felspar, which occur in the Forez, and of which the granite of Auvergne is a continuation, seem evidently to be the material of which trachyte is composed; and where it is intermixed with hornblende, it has darkened the colour, and furnished the acicular crystals of the latter mineral. When I say there are beds of granite almost exclusively composed of felspar, I speak of the absolute weight, or quantity in the mass, of which the mica and quartz form only a small part. The

of fire. I cannot, therefore, agree with Dr. Daubenny in supposing the isolated mountains of trachyte in Auvergne to have been ejected in the state of mud. The occurrence of specular iron ore in the fissures is inconsistent with such a mode of formation: the change from felspar to pumice would also require an intense heat, almost sufficient to volatilise the melted mineral matter; nor do the general appearances in the trachyte of Auvergne, or those described in the trachyte of the Lipari islands, favour the supposition of this rock having been formed by an eruption of mud. Whereas, the beds of volcanic tuffa in this district, which have a soft earthy paste, I am of opinion may be considered as the products of an eruption of earthy matter, in the form of mud, intermixed with fragments of scoriæ and lava, and with bitumen which was preserved from burning by the intermixture of water.

I have before mentioned, that much diversity of opinion prevails respecting the formation of the trachyte mountains of Auvergne; and in what I have advanced respecting it I have merely stated what appear to me to be fair inferences, from exist-

ing appearances, without any desire to overturn the hypotheses of former observers.

M. Professor Cordier very sensibly remarked, on my return to Paris, that a set of working miners, employed to excavate and clear away the débris from the Puy de Chopine, would do more to elucidate the theory of this mountain than the speculations of geologists; but geological experiments, for the purposes of pure science, have never yet been undertaken in any country.

South of the mountains of Clermont rises *Mont d'Or*, a mountain, or rather range of mountains, composed principally of trachyte, rising to the height of 6175 feet above the sea. When we were at Clermont, we saw these mountains covered with snow. The trachyte of Mont d'Or, of which I obtained specimens, is generally more compact than that of the Puy de Dome, and is described by D'Aubuisson as being covered in many parts with scoriaceous lava and basalt, which appears to have flowed down its sides, though no crater can be at present discovered.

In *Cantal*, a mountain still farther south, the trachyte, though associated with vol-

canic rocks, presents the characters of what is regarded as primitive porphyry, and among others a green porphyry, exactly similar to the antique green porphyry. Thus in Auvergne, a connection may be traced from currents of scoriaceous lava, on the sides of existing craters, to cellular and compact basalt; from basalt to pitch-stone and phonolite; thence to trachyte; and from friable trachyte and pumice to the hardest porphyrys, exactly resembling those called primitive. Now geologists are agreed that porphyry is only a mode of granite, in which the minerals that compose the paste are so minute and intimately blended, as to form an apparently homogeneous mass, in which the larger crystals are imbedded. We have, therefore, a regular series, from volcanic products to granite. Again, in the granite of Auvergne and the middle of France, as well as in the granitic rocks of England, in Leicestershire, Warwickshire, and Worcestershire, we may reverse the series, and see granite passing into porphyritic granite and syenite; and syenite passing into greenstone, in every respect resembling basalt; and I believe the basalt of Dudley to be a part also of the same form-

ation. The rocks of this granitic series may, therefore, with much probability, be regarded as elder brothers of those belonging to the volcanic series, having one common parentage. In England we have not the opportunity of tracing the volcanic series, as we have no remains of craters, or currents of lava, similar to those of volcanoes at present in a state of activity; the chain of evidence in our own island is therefore incomplete; but in Auvergne it is perfect in all its parts.

The existence of volcanic mountains, spread over so many hundred square miles in the interior of France, naturally leads to two important inquiries —

1st. *How many years or ages have passed away since the most recent of these volcanoes were in an active state?* and, 2dly, *Is the volcanic fire which once raged so extensively in these districts extinct; or has it, like the fires of Vesuvius, periods of returning activity at distant intervals of time?* To the first of these inquiries, the history of Europe gives us no answer, and from this silence, it has been generally inferred that no volcanic eruption has taken place in Auvergne since Cæsar was encamped be-

fore Gergovia, nor for a considerable period before that time, as he mentions no tradition of any such event. It is not, however, beyond the range of probability, that in a country so thinly inhabited as the mountainous parts of Auvergne, volcanic eruptions might have taken place after the fall of the western empire, without being noticed or known by the historians of the barbarous ages. Men were then too earnestly engaged in destroying each other, or in providing for their own safety, to bestow much thought on natural phenomena. The freshness of some of the volcanoes in Auvergne might even induce the observer to believe that they were burning in the last century, were he not assured to the contrary by the undoubted testimony of the inhabitants, and the traditions of their forefathers. But though the page of human history can afford no information respecting the date of these eruptions, the volume of nature presents to the attentive observer certain indications of that epoch in the history of our planet, in which the more recent currents of lava were ejected. Some of these currents descend into the valleys, following their declivities and sinu-

osities; hence we obtain the certain proof that they have flowed subsequently to the period when the valleys were excavated, and the surface of the earth had acquired its present form, and, therefore, subsequently to the last great revolution of the globe.

But what is more illustrative of our present inquiry, the lava has been observed covering a soil, on which are a species of terrestrial shell (the cyclostoma elegans) similar to the species that at present exist in the country. This fact, which was communicated to me by M. Beudant, who discovered these shells, is highly important, as it proves that some of these volcanic eruptions took place on dry land, and when the earth was tenanted by a species of animals now existing. Perhaps future examinations may discover other animal remains under the lava, which may mark more precisely the period of these eruptions. Perhaps some vestiges of the labours of man may also be found, hereafter enveloped in volcanic matter, though the state of ancient Gaul forbids the expectation of finding subterraneous cities, like Herculaneum or Pompeii. With respect to

the more ancient currents of lava in Auvergne, we have no data to ascertain the periods of their eruption, except from their geological relation with the strata on which they repose; but from the animal remains I discovered in the limestone of Gergovia, which were covered by these currents, we may place the date of their formation, as subsequent to the existence of palotheria and other animals of the Paris basin.

Respecting the second inquiry, whether the volcanic fires that once raged in this district have periods of returning activity, we have no method of forming even a probable conjecture on the subject, except by a comparative view of what has taken place in other volcanic districts. We have instances of volcanoes remaining inactive for one century, and then breaking out with great violence, as at Guadaloupe; other volcanoes, as in Teneriffe, the Azores, and the Grecian Archipelago, have renewed their eruptions after a cessation of three or four centuries. Vesuvius had been dormant for more than seven centuries, and was richly adorned with villas, when the great eruption in the seventy-ninth year of the

Christian era took place. Again, from the twelfth to the sixteenth century, a period of four hundred years, it was in a state of repose, and forests of large chesnut-trees were growing in the crater, prior to the great eruption of 1631. Now, many of the volcanoes in Auvergne preserve not only the form of their craters unchanged, but to this day remain nearly bare of vegetation, and the lava may be seen hanging in ropy flakes, as if it were but recently congealed: this freshness of the stone, and the resistance to vegetation, depends, however, more on the nature of the lava than on its age, as some very ancient currents of lava from Etna are still bare, while more recent ones are covered with a vegetable soil. There is, however, nothing in the external appearance of the volcanoes of Auvergne which can lead the observer to conclude that their eruptions will never be renewed; and the springs of hot water in this district, indicate that the source of subterranean heat beneath it is not extinct. The most abundant and best known of these springs are at Mont d'Or and Vichy: they have a temperature of from 120° to 125°; but there are many other springs which have as high

a temperature. From the whole of . . iom, dence before us, it does not appear in. by bable that the volcanoes of this . sus- may again resume their activity; fo . go- an event would not be at variance w . by present knowledge of these operati . A volcano that had been dormant for 20. years, is said to have broken out sudden[ly] in Calabria, in the year 1702; an . what not certain that those of Auvergne have been inactive for so long a period. M. Biot, the celebrated French mathematician, has recently inferred, from experiments made on the vibration of the pendulum i. different latitudes, that in the middl[e] . France, and in the district of Auvergne. the density of the earth is less than in . situations in the same parallels of la[titude]. "This local decrease of gravity in th . in countries," he says, "seems to indic . on- with some probability, that there are immense cavities under the surface; this would be accounted for by the existence of nu merous volcanoes, of which these strata shew the traces, and explain why they are, even now, at intervals, the foci of subterraneous convulsions."

The earthquake which we experienced

...eva, on February the 19th, was very ...ibly felt in Auvergne, nearly at the ... time; and I have before remarked, ... ere was a great eruption from Vesu... the same and the following days. ..., in speaking of the extent and ra... of earthquakes, says, "The only probable opinion that seems to reconcile, in a ... legree, the energy and extent of ...se phenomena, and often their correspondence in distant countries, would be to suppose, conformably to many other physical indications, that the solid surface on which we live is but of inconsiderable thickness, compared with the semi-diameter of the terrestrial globe, being only a recent ..., covering a liquid nucleus, perhaps ... in a state of ignition, in which great ...cal or physical phenomena, operating ...rvals, cause those agitations which a... ...smitted to the surface. The countries ...ere the superficial crust is less thick, or l... strong, or more recently or imperfectly consolidated, would, agreeably to this hypothesis, be the most liable to be convulsed or broken "by the violence of these internal explosions."

At the end of the market-place in R
a lofty crucifix has lately been erected
the missionaries, with a colossal figure
pended upon it, of Christ in the last a
nies, but superbly gilt, and surmounted
the crown and arms of the Bourbons
number of devotees were kneeling down in
the open air before it, and adoring these
emblems of religion and royalty. In
manner the French government can sup-
pose that the cause of religion will be pro-
moted by thus reviving the rites of ancient
superstition, and mingling with them much
military parade, and the tawdry decorations
of royalty, it is difficult to conceive, unless
it be supposed practicable to revive also
the ignorance and barbarity of the dark
ages. That these exhibitions have th
tendency to prejudice intelligent peo
France against all religion, I am full
vinced from my own observation and
among people less intelligent, it p uces
a strange confusion of ideas, which is some-
times truly ludicrous. At Paris, the nobles
have now a god of their own, created by
the government, called "*Le Saint Esprit de Cordon Bleu*," or the Holy Ghost of the Blue

Ribband; nor are the common people in the country behind them in absurdity.

During the dreadful thunder storm on the mountains before described, our guide and voiturier were both taken into our patache, which we used in these excursions. Our guide began to preach to the voiturier, saying, that the thunder afforded a strong proof of the existence of God; but after several common-place observations, he added: "*On ne doit pas oublier le Fils et le Saint Esprit; ils sont tous egaux et dieux; mais le Saint Esprit gouverne tout, parce qu'il a de l'Esprit.*" It is greatly to be regretted that those who at present attempt to direct the public mind in France, should evince such a want of good sense and good taste: the extravagancies of superstition which they strive to introduce are not essential parts of the catholic religion, and are in direct opposition to the spirit of the age and country in which they are revived.

From Riom we proceeded leisurely to Moulins. The soil continues extremely rich for several miles, being on the fresh-water limestone and marl, with which it is associated; it then suddenly changes for the worse. We passed a small hill of gyp-

sum, *Montpensier*, at some distance from the road on the right, which is quarried. Beyond Montpensier, at a small town called Mallet de l'Ecole, we saw, for the last time on our route, the Puy de Dome and the mountains of Auvergne. At this place, while the horse was resting, I observed some heaps of the most singular limestone I had ever examined, partly tubular, and apparently composed of the remains of some aquatic animal. Blocks of this limestone were scattered over the country as far as Moulins. On shewing a specimen of it to M. Brogniart at Paris, he informed me, that beside the blocks scattered over the country, there is one rock of it known *in situ;* it is considered to be a part of the fresh-water limestone of Auvergne, and the animal remains in it are supposed to belong to the larvæ of some large aquatic insect, to which *De Base* has given the name of *Indusia tabulata.* These remains are often mixed with *helices* and *paludines.* Beyond Mallet de l'Ecole there is a place on the west of the road called *Pierre Percée,* which is, in all probability, the situation where this tubular limestone occurs *in situ.*

The first night after leaving Riom, we

slept at *St. Purcain*, where we found an excellent inn; the lodging rooms were extremely neat, and handsomely furnished, very unlike those in the more southern parts of France. Moulins contains about 13,000 inhabitants; it is a manufacturing town; its manufactures are of silk, cotton, and cutlery. From Moulins to Nevers the the soil is chiefly gravel, which, on examination, I found was principally composed of fragments of primitive rocks, probably the detritus of the Forez mountains, which we saw in the eastern horizon. We remained at Nevers two days in a comfortable inn, *l'Hotel de la France*, a little out of the town, on the road to Paris. In this town a most magnificent cross has lately been erected by the missionaries, which is said to have cost 1500 napoleons. The inhabitants of Moulins were wiser; both royalists and constitutionalists protested against the entrance of the missionaries into Moulins, as they were well satisfied with the regular clergy of the place.

Nevers is situated at the junction of the river Nievre with the Loire. The bagpipe is here the popular music, to which the

people were dancing on the public walks on the Sunday.

Briare, on the Loire, north of Nevers, is the place where the canal commences, that unites the Loire and the Seine. After leaving Briare the road rises from the valley of the Loire to a sandy plain, similar in appearance, and, I believe, in geological position, to that of Bagshot heath. About two miles beyond Briare, we were shown a large château, which, with several thousand acres of ground, had been purchased by three Irish gentlemen, with the intent to improve and cultivate this sterile soil; they were still residing there, but the experiment was understood to have entirely failed. In proceeding, the heaps of flint by the road side, indicated that we were approaching the upper chalk formation.

The second night after leaving Nevers, we slept at *Montargis*. The large ancient castle is situated on a rising ground above the town; it is often mentioned in the history of France. This castle had been recently purchased as national property by some persons on speculation, who were pulling it down and selling the materials, at the time we were there. It is impossible

to see without regret the destruction of these monuments of past ages, that properly belong to the country where they are placed, and are identified with its historic records.

The popular story of the Dog of Montargis, we were informed by a French gentleman, well acquainted with the history and antiquities of the country, originated from a piece of sculpture over the mantlepiece of the great hall in the castle of Montargis, representing a dog rescuing a child from assassins; but the real history of the sculpture is unknown. The approach to Nemours from the south, is beautiful, and the rocks of sandstone in the vicinity, though on a small scale, are very picturesque. The palace and gardens of Fontainbleau have been often described; we spent a day here. A small apartment in the palace contains the table on which Napoleon signed his abdication. When we consider the state of mind of that extraordinary character, the situation of France, and the hopes and fears of all the civilized world at the time; we must regard the moment of Napoleon's abdication, as the most eventful crisis in the history of modern Europe.

Fontainbleau appears like a deserted city; many of the best houses are closed, and grass is growing in the streets. Those inhabitants whom I conversed with, preserve a kind of religious veneration for the memory of the emperor.

The singular sandstone rocks, near Fontainbleau, do not resemble any rock scenery in this country; nor is the stratum of sandstone, of which they are composed, to be found in any part of England, except in detached blocks, provincially called *grey weathers*, that are scattered over the surface in some of our southern counties. It is a pure sandstone, the grains of which are often loosely adhering, so as to be almost friable, which is also the case with the sandstone of Mont Martre.

Fontainbleau must be, I conceive, a a healthy and cheap residence, and with good society would be particularly agreeable in the summer, on which account I was surprised to see so many houses unoccupied. It is also a convenient distance from Paris. We were told that several English families had lately hired houses at Fontainbleau.

Though it was only the latter end of

May, the heat was extreme, and when we arrived at Paris, and during the three weeks we were there, the thermometer often ranged from 90 to 95° Fahrenheit, which is a very unusual temperature for that city; but the sky was clear, and the air balmy and refreshing. The gardens of Paris were in their highest state of beauty; thousands of roses, in full bloom, filled the atmosphere with perfume, and notwithstanding the great height of the thermometer, the heat was not so oppressive as I have often experienced it in this country, under a cloudy sky, when the temperature did not exceed seventy-five. When I had visited Paris before, it was at the latter end of the year, and its gloomy appearance formed a striking contrast to the present brilliancy and gaiety of the environs of this city. The public lectures were not yet closed, and I had the opportunity of seeing some of the professors with whom I had become acquainted on my former visits. Professor Brogniart, who superintends the porcelain manufacture at Seves, invited us to see that establishment, and obligingly accompanied us to some of the more interesting parts of the manufacture. M. Brogniart informed

me that, for the more costly articles, the porcelain earth, after it is made into a paste by grinding, is kept for six or seven years in a damp cellar, before it is used, in order that it may become perfectly homogeneous in its texture and density. This is of the highest importance, that it may contract equally in baking. The large vases for which this manufacture is so celebrated, are obliged to be made at first in three parts, and as they shrink more than one-fourth in bulk, the first time they are in the furnace, it requires the greatest care in the preparation of the materials, as well as in the process, in order that the parts may fit exactly after they are baked. After the first baking, the parts are cemented together, and go into the furnace four times before they are painted.

I did not think it right to ask any questions respecting the mineral substances employed, which M. Brogniart might not have felt himself at liberty to answer, but he showed me a mass of granite, with crystals of pinite imbedded; and as the latter mineral is common in the granitic rocks near Auvergne, it is probable that these

rocks, and those of the Forez supply the principal materials for the porcelain earth. In one room are models of all the different articles made here since the first establishment of this manufacture in 1751, to the present day, arranged in chronological order, which are curious, as showing the progress of improvement. The most costly articles are not made for sale, but for the use of the royal family and for presents to foreign courts; but though not sold, a regular account is kept of the expense of the manufacture, and the value of each. One of the largest vases was valued at twenty-five thousand francs, and a most elegant flower-stand, beautifully painted, was valued at thirty-six thousand.

After seeing the manufacture of Seves, we proceeded to Meudon, and spent the remainder of the day there. "Delightful Meudon," as it is called by Madame Roland, in her Memoirs, possesses more natural beauty of situation than is elsewhere to be seen in the vicinity of Paris, and yet there is not one tolerable auberge in the village, which is, perhaps, a proof of what has been commonly asserted, that

the Parisians have no great taste for the beauties of nature.

Returning late from Versailles one evening, I found upon my table, in the hotel, a card of invitation to attend the funeral of Professor Haüy, the celebrated mineralogist, on the following morning. The invitation is somewhat curious, containing an elaborate enumeration of all the titles of the deceased, and serves to show that the taste for display which is supposed to characterise our neighbours the French, does not forsake them on the most serious occasions.

MONSIEUR BAKEWELL.

Rue de Richlieu, Hotel de Bruxelles.

M.

Vous êtes prié d'assister aux convoi, service, et enterrement de M. Réné-Just HAUY, *Chanoine honoraire de la métropole; Membre de la Légion d'Honneur; Chevalier de l'Ordre Royal de Saint-Michel de Bavière; de l'Académie Royal des Sciences; Professeur de Minéralogie au Jardin du Roi et à la Faculté des Sciences de Paris; de la Société Royale de Londres; des Académies des*

Sciences de Saint-Pétersbourg, de Berlin, de Stockholm, de Lisbonne, et de Munich ; de la Société Géologique de Londres ; de l'Université impériale de Wilna, de la Societé Helvétienne des Scrutateurs de la Nature, et de celle de Berlin, des Sociétés Minéralogiques de Dresde et de Jéna, de la Societé Batave, des Sciences de Harlem ; de la Societé Italienne des Sciences ; des Sociétés Philomatique et d'Histoire Naturelle de Paris, etc, décedé en sa maison, au Jardin du Roi, le 1r Juin, 1822, à l'age de soixante-dix-neuf ans et trois mois ;

Qui se feront, le Lundi, 3 Juin 1822, en l'église paroissiale de Saint Médard, à dix heures du matin.

De Profundis,

De la part de Monsieur et Madame Vuillemot Hauy, *et de Monsieur et Madame* Rougeron, ses neveu, nièce, petit neveu et petite nièce.

On no occasion does the vanity of a long enumeration of titles strike the mind so forcibly as when we are following their late possessor to the grave.

> "Can honour's voice awake the silent dust,
> Or flattery sooth the dull cold ear of death?"

On arriving at the Jardin des Plantes, I found the coffin placed in the gateway of the Abbé's house, to receive the lustrations of holy water from the passengers. The funeral service would have been performed at the great church of Notre Dame, of which the Abbé Haüy was an honorary Canon, but the king and the peers were going the same day to Notre Dame, to call down *l'Esprit Saint de Cordon Bleu*, to assist their deliberations in the approaching session. On this account the funeral service was performed in the church of St. Medard. The procession was on foot.

I had a place in the church between the coffin and the altar, where mass was performed. As the Abbé Haüy was a member of the legion of honour, a file of soldiers stood round the coffin, and presented arms to the host. The ceremony was long and uninteresting, and destitute of every thing which could properly impress the mind on so solemn an occasion. The mixture of military parade had also a tendency to disturb the train of serious reflections, naturally excited by seeing the remains of one who had been eminently distinguished by the acuteness of his researches, sur-

rounded by the first scientific characters in France. On such an occasion it is impossible to avoid feeling that the paths of science, like "the paths of glory, lead but to the grave;" but the ceremony had no visible reference to the subject: when it was over a collection was made for the poor, and the company walked round the bier, and sprinkled it with holy water. Coaches were in attendance to carry the company from the church to the cimetière du Père de la Chaise, but I did not go, for I was already sufficiently tired of the ceremony, and the heat was excessive. The Abbé Haüy had finished a second edition of his Mineralogy, except the last page, the day before his decease, and in the eightieth year of his life: he had also corrected the first volume of that work for the press. Those who are acquainted with the variety of curious and extremely intricate research which it contains, illustrated by mathematical demonstrations, and a great number of complex diagrams, will admire the extraordinary vigour of a mind, which could preserve its freshness to such an advanced age. In perusing the biography of men of science and men of

literature, I have often been struck with the great difference which they frequently present. There is something in the study of nature ever new, which has a tendency both to invigorate and to tranquillize the mind; and we find that the lives of men of science have generally been happy, and their deaths peaceful, while the lives of men exclusively devoted to polite literature, have too often been embittered by envy, jealousy, ennui, and disappointment.

APPENDIX.

OBSERVATIONS ON THE GEOLOGY OF THE ALPS AND THE STRATIFICATION OF THE CALCAREOUS MOUNTAINS.

It was my original design to have entered at some length into a description of the stratification of the calcareous mountains on the northern side of the Alps, which I studied with considerable attention; I had also spent much time in taking illustrative sections. On reflection, I am convinced that the subject, though important to the geologist, would be dry and uninviting to the general reader, and would, beside, require a considerable expence in engravings, wooden cuts being too small and indistinct to represent geological sections of much extent. I shall, therefore, content myself for the present with giving

a brief outline of the geology of those parts of the Swiss Alps which I examined, and a few cases of the stratification of the calcareous mountains; these I should have inserted in the preceding chapters, had I not been afraid of alarming those readers who may have no taste for such subjects.

The vast deposition of sandstone, called molasse, and of sand with immense bolders, called by the Germans, *nagel flue* *, that fills the basin of the Lake of Geneva to the Jura, and extends on the north side of the Alps, through Switzerland, and into Germany, is regarded by most geologists as an alluvial deposition, of a recent date, compared to any of the calcareous mountains of the Alps, but still more ancient than the formation of the valleys, as the course of the valleys cuts through this sandstone to a great depth. I am, however, of opinion, that a considerable portion of this formation of sand and molasse is, at least, as ancient as the upper limestones of the Alps; I have before

* The Genevese apply the term *mollase* to the softer beds of sandstone; the harder they call *gres*. Nagel flue, or nailhead stone, is pudding-stone-conglomerate.

mentioned that I observed beds of the molasse in Savoy, covered by an immense thickness of limestone, as ancient as the oölite of England; and this is the case, not in one position only, for the molasse extends over a great part of the western side of Savoy, and is almost every where covered with limestone, under which it is seen on the sides of the mountains, as I have noticed, Chap. V. Vol. I. The molasse also alternates with the limestone in some situations.

In the Pays de Vaud, I have seen a bed of what would be called greywacke slate interstratified with the sand containing bolders, or *nagel flue* of the Germans. It is also remarkable, that these beds of sandstone-conglomorate and molasse, dip towards the calcareous mountains of Switzerland, and appear to pass under them, and doubtless do so in many instances, as I have shewn to be the case in Savoy. Yet many of the French geologists deny this, for no better reason that I can discover, than an attachment to theory. The fact is, there are two, if not more, formations of this sandstone and conglomerate near the Alps, the one comparatively recent, the

other more ancient than the upper calcareous beds. Indeed, some of the beds of sandstone-conglomerate must be nearly as ancient as the older slate-rocks of the Alps, as they appear interstratified with them. The beds of soft conglomerate near Geneva, which are cut through by the Arve to a great depth, and contain rolled masses of limestone, with those of other rocks, are doubtless of comparatively recent date, and were deposited when the waters of the lake covered the whole valley to a great depth, and were probably laid dry by the opening of the passage of l'Ecluse, described p. 259. of this volume. Standing on the elevated plain which is the summit of this bed of conglomerate, opposite to Carrouges, I was struck with an appearance which indicated that the waters of the lake had not retired gradually and regularly, but suddenly, and at different periods. Below the upper plain, or plateau, formed of this conglomerate, and which is nearly flat, there is a steep descent of one hundred feet or more, to a second plateau of conglomerate, which is also flat; and it is in this lower plain, that the channel or bed of the Arve is excavated

to the depth of two hundred and fifty or three hundred feet. Now it appears, that when the upper plain was first laid dry, the waters stood for a long time at a lower level, having excavated the second plain, after which the deep channel of the Arve was formed by a more rapid retiring of the water. If we suppose the passage of l'Ecluse to have been suddenly opened, and then partially closed again by the débris carried down by the torrent, and after a long interval to have been re-opened, the present state of the surface of the two *plateaux* or plains would be satisfactorily accounted for.

There are other beds of molasse that alternate with limestone, but which we are compelled to regard as the most recent formations of strata, if we are to judge from the organic remains found in them. Thus the strata of Alpnach, (see page 168 of this vol.,) which contain perfect teeth of the mastodon in high preservation, cannot perhaps be considered as more ancient than the upper strata of the Paris Basin; but even in this case, the occurrence of bones of the largest mammalia at the depth of 300 feet under regular strata is a most extraordinary fact. In the stratum which contains the

teeth, there are very minute shells that are supposed to be fresh-water shells. The coal immediately under the stratum containing the bones, has the surface and fracture of true mineral coal. The bone stratum, which is a dark bituminous limestone, forms the roof of the coal. The limestone (see p. 168) in Professor Meisner's section, 240 feet above the coal, bears a strong resemblance to Jura limestone. I greatly regret that I did not go to Alpnach from Brientz, to study this singular formation, for it has not excited the attention which it deserves. I took a specimen with me to one of the meetings of the Philosophical Society at Geneva, in order to direct their attention to the close resemblance which the strata bore to those of our regular coal strata in England; but the Genevese were too little acquainted with coal formations to appreciate the importance of the enquiry, and a young man who had got a smattering of geology at Paris, solved all the difficulties respecting it, with much self-satisfaction, by saying "there was nothing extraordinary in the case,—the coal of Alpnach was only *wood coal*." But granting that the coal of Alpnach were real wood coal, still the mys-

tery is in no degree removed; for the close resemblance which it bears to mineral coal, and the striking similarity of the strata in which it is imbedded, to many of the strata in our regular coal formations, added to the occurrence of bones and teeth of the large mammalia at such a depth, under well defined strata, present subjects for inquiry of the highest interest in geology. I flatter myself with the hope of visiting Alpnach at no distant period; but I shall be happy to hear that some English geologist, well acquainted with our coal strata, has examined it in connection with the geology of the northern side of the Alps. The French geologists have but little practical knowledge of the regular coal formations.

The position of the beds of sandstone-conglomerate in Switzerland is extremely interesting to the geologist, for in many situations these beds are highly inclined, or nearly vertical, and rise to an astonishing height. Now, as they are filled with rounded bolders of great size, we are certain that they could not have been originally deposited in their present position, but were at first nearly horizontal; hence we obtain the proof that the surface of the

globe has been broken and raised since the depositions of the most recent formations, if we agree with most geologists in regarding some of the beds of conglomerate as such.

The immense blocks of granite, and other primitive rocks, that are scattered over the calcareous mountains and in the valleys of Switzerland and Savoy, have long engaged the attention, and divided the opinions of geologists. No where are these blocks seen more abundantly distributed, than in various parts of the basin of the Lake of Geneva. They have all been transported from a great distance, as there are no rocks of a similar kind in the vicinity, and some of the rocks are not found within the space of 100 miles, or more, from the places where these vast fragments are now lying. The most striking analogous fact that I am acquainted with in my own country (south of Scotland) occurs in the vicinity of Kendal, in Westmoreland, where blocks of granite of great size are scattered in the fields. These blocks are identical with the granite of a mountain near Shap, a granite so remarkable that it may be distinguished from any other in Europe. The granite mountain at Shap has no great ele-

vation, and higher mountains intervene between it and Kendal. This, I say, is the most remarkable fact that south Britain presents, because we are quite certain from whence the blocks have been transported. In the basin of the Lake of Geneva we sometimes see the blocks collected in groups, and sometimes widely scattered; in some situations they are all of one kind of rock, in others several kinds of rock occur together; but the most extraordinary circumstances are the great size of these blocks, and the height at which they occur. On the Great Saleve, near Geneva, there is one block of granite seven feet long, at the height of 2500 feet above the valley: some blocks are found on the south side of the valley, at the height of 3000 feet above it. In a wood between Copey and Nyon there is one block of hornstone seventy-three feet in length; and near Nyon there is a field covered with blocks of saussurite, which the proprietor has in vain endeavoured to remove by blasting, on account of the unconquerable hardness of that rock. No rock of this mineral is known to occur nearer than the valley of Saas in the Vallais. Mr. Andrew De Luc, who has

paid much attention to the subject, informed me that a great number of large masses of granite may be seen in the Lake of Geneva, between Geneva and Thonon; which proves that this part of the bottom of the lake has not undergone any considerable change, since the distant period at which the stones were brought into it, otherwise they would have been covered with sediment.

The south side of the Little Saleve, a limestone mountain near Geneva, is in some parts nearly covered with blocks of granite of immense size; among these I observed some which seem to have been broken by their fall. The granite is similar to that of Chamouny. Nothing more strongly indicates the great convulsions which the surface of our planet has undergone, than these enormous masses of stone, which have been transported to such a great distance, and placed upon a soil to which they are foreign. Of all the hypotheses that have been formed to explain the cause and manner of their transportation, that of Sir James Hall appears to me the most probable; but there is one question that has been overlooked. The deeply curved stratification of the calcareous mountains of Savoy and the Jura, clearly indicates that

the beds composing these mountains have been elevated from a position nearly horizontal. *Now, is it not possible that the granite blocks were deposited upon the level soil, and raised up with the calcareous mountains themselves?*

Whether any strata, similar to the fresh-water formations of the Paris basin and its associated sandstone, occur on the Alps, remains yet to be proved; but on the mountains of the Diablerets there are strata filled with cerithia, of which I obtained a great number at Bex, and these appear similar to some of the species in the Paris basin. Cerithia are also found on the Montagne de Fis, near Servos.

On the top of the Great Saleve there is a white sand and sandstone, which is purely siliceous. I did not see it *in situ*, but specimens that were given me resembled the white sandstone of the Paris basin, and the English grey-weathers; and I think it not improbable that it is a similar formation, If the strata of the Diablerets and the Montagne de Fis, at the height of 7 or 8000 feet, which contain fossils of the Paris basin, really belong to that formation, is it not more reasonable to believe that they have

been raised up, since their deposition, than that fresh-water formations have covered any part of the globe at such a vast elevation?—and the same may be said of the sandstone of the Saleve, though the latter is not half the height.

The calcareous mountains on the northern side of the Grecian and Pennine Alps, that extend through Savoy, I have frequently referred to, and also to that part of the Jura which unites with them at the Vouaches. See Chap. 5, 8, 9, and 10 of the 1st Vol., and Chap. 1 and 7 of the present volume.

The calcareous mountains of the Swiss Alps must be regarded as part of the same series, separated only by the deep valley of the Rhône. When I was at Paris, in 1819, Professor Brochant obligingly shewed me several specimens from the calcareous mountains of the Alps, which first led me to doubt the correctness of the classifications which placed these limestones among the transition rocks, if there be any meaning in the term. At the end of 1820 I saw in the cabinet of M. De Luc, at Geneva, a collection of fossils from Switzerland and Savoy, which were analogous to those

in the upper calcareous strata in England. I was anxious to discover whether these fossils really belonged to the great calcareous ranges which extend on the northern side of the Alps, or only to some partial formation that covered them in particular situations. During the four months that I spent in Savoy, I directed my principal attention to this subject. I was at first surprised to see, that the calcareous strata covering these fossils, had the hardness and crystalline texture of perfect marble, and I was no longer surprised that geologists had classed them with the oldest limestones; but I was soon convinced that in the Alps, strata similar in geological position, and containing the same fossils as those in our upper strata, are not only formed on a scale of magnitude incomparably greater, but have also acquired a high degree of induration, and a crystalline structure, which destroys in a great measure the similarity of mineral characters with those of the British strata. This extreme hardness has also frequently obliterated, or nearly concealed, the traces of organic existence, except in situations where they have been developed by the action of the

weather on the surface of the rock. My observations in Savoy led me to the conclusion, that a great part of the calcareous strata which form such magnificent mountain ranges, are composed of what are denominated in England lias-limestones and oölites, extending upwards to the green sand and chalk-marl, if not to the lower chalk, which I am inclined to believe appears here under a different form, approaching nearly to the character of a white marble.

In several of the preceding chapters I have stated my observations and opinions upon this subject at some length.

While engaged in the examination of Savoy, I was not aware that two distinguished geologists, Professors Brogniart and Buckland, were examining distant parts of the Alps, and had come to nearly similar conclusions respecting the calcareous strata. I am, however, inclined to carry these conclusions much farther than M. Brogniart has done; and am persuaded that the same, or similar causes, which have changed what are earthy limestones in England into hard marbles in the Alps, have also converted our lias-clay, shales, and clunch,

into indurated clay-slate, or dark schist, but which still contain ammonites and belemnites, the characteristic fossils of our lias-clay and clunch: and if the limestone associated with the gypsum of the Alps be the same as our magnesian limestone, the strata under it containing anthracite, correspond also with our regular coal formations, with which, though on a smaller scale, I am fully convinced they agree. The mountain, or transition limestones under coal, if they occur at all in the Alps, appear to occupy but a small space, and the coal strata are succeeded by dark schist, mica-slate, and granit-veiné. Such I observed to be their position in the Tarentaise, and as the gypsum formation seems to be the same with that of Switzerland, it is probable that the strata agree in other respects. There is, however, in Switzerland, near Interlaken, an extensive formation of limestone, so intermixed with argillaceous and siliceous earth, as to pass ultimately into a kind of hornstone. To what formation it belongs I was unable to ascertain.

M. Charpentier, one of the superintendants of the salines at Bex, has published a short memoir on the stratification of the moun-

tains near Bex, the substance of which I shall subjoin. M. C. has, however, fallen into the general error of geologists, of describing the strata as belonging to the transition series, though the fossils they principally contain are those peculiar to our upper strata, such as ammonites and belemnites; this error has hitherto vitiated almost all the geological descriptions of the Alps, from the writings of Saussure to the present time.

The paper of M. Charpentier was read to the Helvetic Society of Natural History, Aug. 27, 1818; its main object is to prove that the gypsum of the Alps is not deposited irregularly over the other strata, as some geologists maintain. The latter opinion has also been maintained respecting the gypsum of the Tarentaise, which I have proved to be erroneous, (see Vol. I. Chap. VIII.) M. Charpentier states, that the transition rocks (as he calls them) in the environs of Bex, repose upon the primitive rocks, as may be seen on the road from Lavey to Morcles. The northern chain of the Alps, being cut through by the Rhône, between St. Maurice and Martigny, shows also this super-position. The primitive

rocks are here small-grained granite, passing into porphyry or compact felspar, and sometimes into gneiss and mica-slate. The rock which reposes immediately on the primitive is a sandstone, (*gres*,) formed of small fragments of quartz and felspar, slightly rounded, and agglutinated by an argillaceous cement, scarcely visible. This is covered by a greyish-black limestone, with a fine paste, and a chonchoidal fracture, which is occasionally reddish-white, veined with grey, and sometimes a coarse-grained limestone, with scales of mica or talc. Near the bridge of St. Maurice it is oölitic, and sometimes alternates with schist. It contains but few shells; some belemnites are found in it, and nodules (*rognons*) of hornstone passing into flint. This limestone forms an immense bed, divided into strata from one to five feet in thickness; it constitutes the rocks of St. Maurice, Lavey, St. Triphon, and Chatel d'Aigle, which occur in nearly horizontal beds, but are slightly inclined to the north, near St. Maurice and Lavey.

An argillaceous limestone reposes on this bed, into which it passes, and is intermingled in the lower part; the argilla-

ceous limestone effervesces little with acids, and soon decomposes: ammonites and belemnites occur in it. This limestone contains beds of gypsum, and beds of conglomerate; the latter sometimes resembles breccia, and sometimes pudding-stone; being composed of small or middle-sized fragments, of compact limestone, of granite, of slate, and of quartz; these fragments are slightly rounded, and are agglutinated together by a calcareous cement, and sometimes by a cement of argillaceous schist.

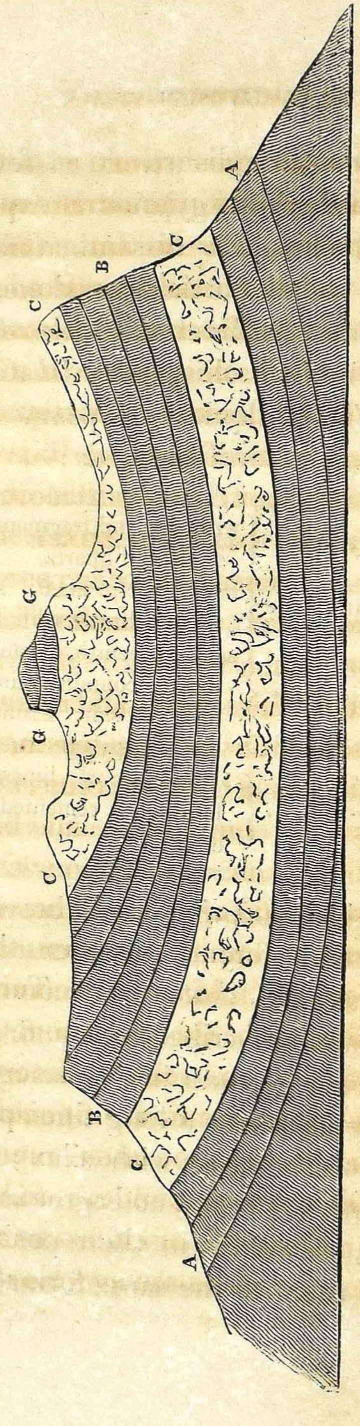
The argillaceous limestone contains also beds of what M. Charpentier calls greywacke and argillaceous schist, with veins of calc-spar eight or ten inches thick, with pyrites, galena, and blende; pyrites is also disseminated in the beds.

All the gypsum in the northern chain of the Alps, and some in the southern chain is situated in this limestone. This gyps, and all the gypsum of Switzerland, with the exception of the Jura, (says M. Charpentier,) is anhydrous, containing minute portions of common gypsum, either disseminated or in veins, or in short thick beds. The anhydrous gypsum passes into common gypsum, by absorbing water; this

process is accomplished in a few days, where the anhydrous gypsum is exposed to the air. Rock salt is disseminated in the gypsum in small particles, and sometimes in larger masses. Rock salt is also dessemi-nated in a bed of schist subordinate to the gypsum. The anhydrous gypsum contains the following subordinate beds: —

1. Common gypsum	with clay and fragments of lime-stone and quartz.
2. Compact limestone	hard fine-grained, sometimes reddish-brown with green.
3. Argillaceous schist	sandy, greenish, passing to grey-wacke, contains veins and no-dules of salt. From this bed the salt springs issue.
5. Breccia	Fragments of limestone and hard clay, cemented by anhy-drite.

From this description it will be seen that there is some difference between the gyp-sum of Bex and that of the Tarentaise, which I have described, chap. 8. vol. i.: the anhydrous gypsum in the latter district resists decomposition a long time, probably from an intermixture with silex; but as they are both saliferous, and agree in various characters, as well as in their position, we must refer them to the same formation.


A
C
B
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A

M. Charpentier has given a section of what he calls the transition strata associated with the gypsum. See the Cut. The lower bed, A. A., represents the sandstone, black limestone, and argillaceous limestone, under the lower bed of gypsum, C. C. An upper bed of argillaceous limestone, B. B. covers this gypsum. The upper bed of gypsum C. C. is also capped by argillaceous limestone, G. G.: the whole resting on a basis of primitive rock. These beds of gypsum may be traced from Bex, to the Lake of Thoun, and probably much farther.

The two beds of limestone and argillaceous limestone associated with the gypsum, are of immense thickness; the fossils they contain, (particularly the ammonites and belemnites,) as well as their connection with saliferous gypsum, indicate that these strata are similar to our upper calcareous formations; and though Mons. C. denominates some of the beds in this limestone, greywacke and argillaceous schist, it ought to be impressed upon the minds of geologists, and can scarcely be too often repeated, that beds which correspond to sandstone and shale in England, often assume the character of greywacke-slate and clay-slate

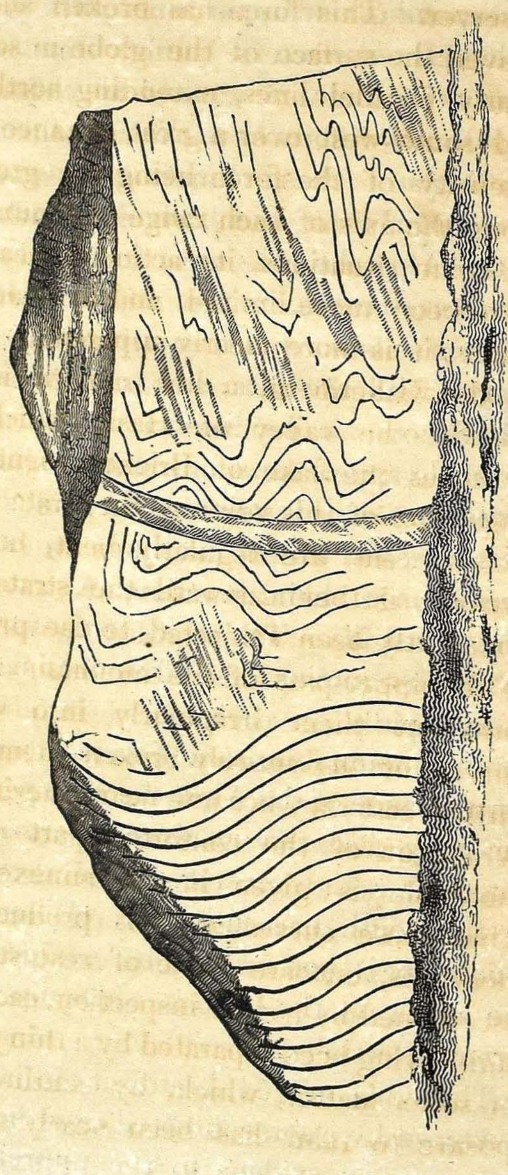
in the Alps, and that the upper earthy limestones of the English, acquire the hardness and other mineral characters of marble. This fact, which has hitherto been little known or regarded, taken in conjunction with the fossil remains, furnish the true key to the comparative geology of these vast ranges of mountains. It is true, we can seldom trace an exact similarity in the geological characters of rocks of distant countries, but we may find a near approximation. Thus the strata in the Swiss Alps, which contain gypsum and rock-salt, agree more with our lias and lias clay, than with any of the lower formations; and as our lias clay is eminently saliferous, the agreement is still so far preserved.* The limestones that are associated with gypsum and salt in the Tarentaise, at least, those which I examined, may, perhaps, more properly be classed with the magnesian limestone in the red marle in England; they have no resemblance to lias.

But if the limestones in the Alps, that

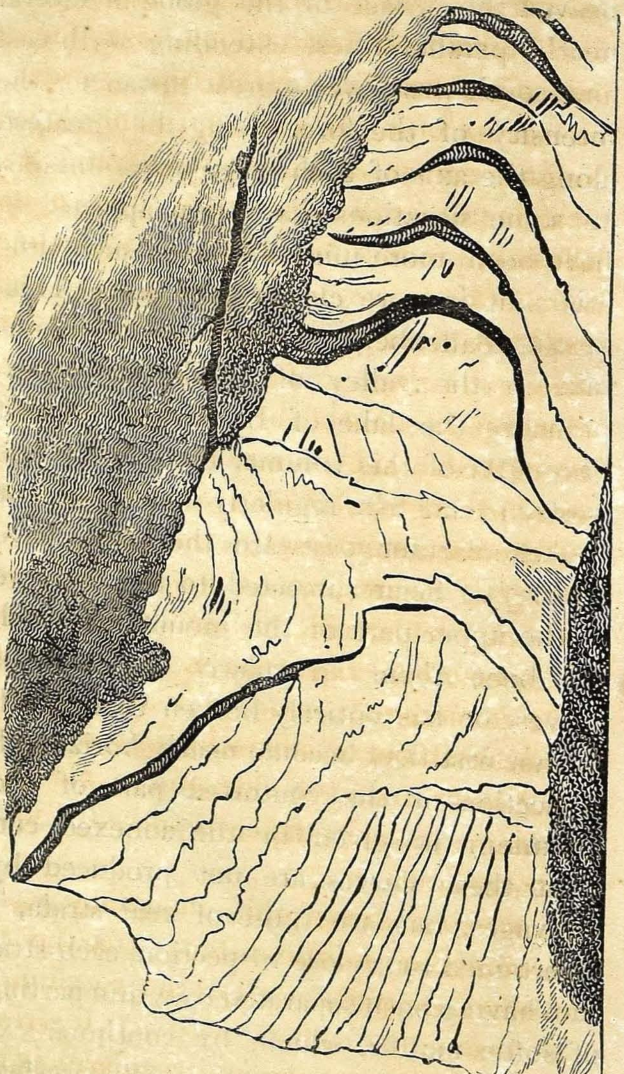
* It is true the muriat of soda, or common salt, in our lias, is generally more or less intermixed with other salts, but this cannot affect the question. The strata in contact with gypsum in the Vallois, I observed, bore a strong resemblance to lias limestone.

correspond to our upper limestones in their geological characters, differ from them greatly in their mineralogical characters, they do not differ less in their stratification. In England these limestones generally occur nearly flat and horizontal; whereas in the Alps they are most frequently bent into deep curves, or are highly inclined. This curved or arched stratification commences with the Jura, and is extended far into Savoy; it produces a variety of remarkable appearances of irregular and contorted, or waved strata, according as the escarpements which cut into the mountains change their direction, or are more or less irregular. The strata at the summits of the mountains are often flat, but dip down rapidly on each side. In the calcareous mountains, at a distance from the central range of the Alps, the escarpements generally face the north or north-west; but nearer the central range, they face to the south or south-west. Where the mountain is not broken by escarpements, the strata on the opposite sides dip in different directions.

That this curved stratification has been produced by a force directed from beneath, must appear evident to the unprejudiced



observer. This force has broken and upheaved the surface of the globe in several nearly parallel lines, extending north-east and south-west over a great distance; the intensity of the force being the greatest, along the axis of each range of mountains. In some situations, its action appears to have been more limited, and in such situations, it is more clearly apparent. Thus at the Ballenberg, a low narrow mountain in the valley of Hasli, which approaches the lake of Brientz, mentioned page 192 of this volume, the strata at the western end are regularly bent, but not broken: farther eastward the strata have apparently been subjected to the pressure of the upper part of the mountain, which has bent them irregularly into various curves, or has entirely broken them; still further east they become nearly horizontal. A section of the contorted part of the mountain is given in the annexed cut. That these curves are not produced by cleavages, but are those of real strata, I ascertained by a close inspection, each stratum having been separated by a thin parting of softer matter, which, by continual exposure to rain, has been nearly washed



away, leaving interstices between, into which I could introduce my hand.

There are other situations, where the calcareous mountains in the Alps, present to the hasty observer the appearance of the most irregular and contorted stratification imaginable, which is merely an optical illusion, produced by a variety of cleavages in the limestone, some ranging at right angles to the line of dip, and others to the line of bearing. There is likewise another cleavage in some of these mountains, which is curved, and is produced by a tendency to a globular structure in the mass of the mountain. At the entrance of the valley of Lauterbrun, there is a mountain on the left hand, called in the maps *Hunnen Fluh*; the strata in the lower part of this mountain, seen in front, are nearly horizontal, but on advancing into the valley of Lauterbrun, the side of the mountain presents the appearance represented in the annexed cut.

After studying this mountain several mornings, at a little distance (for the state of my knee did not allow me to climb up and come in contact with it) I satisfied myself that the apparent irregularity is pro-

duced by the upper strata enveloping the mountain in what is called a mantle-shaped stratification, and the strata that overlap each other, have their edges broken irregularly, presenting the appearance of irregular strata-seams. Near the end of the mountain the true strata-seams are seen, and are nearly horizontal; while further up the valley several curved perpendicular cleavages present the appearance of thick beds or strata, very much bent. In this instance the overlapping of the edges of the strata, and the direction of the natural cleavages, have nearly concealed the true form of the stratification. Such instances as these are of frequent occurrence in the Alps, and have been the source of many erroneous conclusions, for they have hitherto been but imperfectly understood. This tendency to the globular structure *en masse*, I observed very frequently in the Bernese Oberland. It is altogether independent of stratification, though it has often been mistaken for it; but it has not hitherto been noticed that I know of, by any geologist that has visited the Alps.

The limestone, in which I observed the curved cleavage most distinctly, is dark

coloured, hard, and brittle, and is intermixed with schist. This limestone seems to pass by gradation into flinty slate, as the proportion of calcareous earth diminishes, and that of the siliceous earth is increased. In some situations in the Bernese Oberland, I observed a tender black bituminous schist, containing beds of dark schisty limestone, interposed between the great calcareous formation and the granitic rocks. In other parts, the limestone rests on the granite, and where the granite and the limestone are in immediate contact, not unfrequently the beds of each are nearly vertical at their junction. This I observed in the upper part of the valley of Lauterbrun, below the silver mine, on the south-west flanks of the Jungfrau. On the north-east of that range, in the valley of Hasli, Saussure observed, "that the beds of limestone, which were nearly horizontal, changed their position when they approached the granitic rocks, and rose towards them at an angle of from sixty to seventy degrees; and further on, in the same valley, he observed the granite or gneiss, and limestone rising towards each other." (*Voyages dans les Alpes*, tom. iii. p. 454.)

Such facts indicate that the granitic and calcareous beds were elevated together by the same cause, and at the same time; this is more fully confirmed by the similar direction and position of the beds of granite and the secondary strata in Savoy. See p. 12 to 18 in this volume.

The cause by which both the southern and northern range of the Alps were elevated, appears to have acted most intensely, and probably at the same time, along two nearly parallel lines, distant from each other about twenty-five miles, forming the two great Alpine chains on each side of the upper valley of the Rhône, described in Chap. VI. of the present volume. The cause or moving power by which these ranges were elevated has also acted, but with less force, along a number of nearly parallel lines, forming the lower ranges which border the northern side of the Alps.

Wherever the surface was much broken and elevated in one part, it may be supposed that other parts would sink down, and in certain intermediate spaces, the position of the strata would remain unchanged, and be nearly horizontal; and these changes from a vertical to an hori-

zontal position may often be observed in the Alps, both in the beds of granite and gneiss, as well as in the calcareous strata, but far more frequently in the latter.

The general direction of the beds, both in the northern and southern range of Alps, is principally from north-east to south-west, or from north-north-east to south-south-west. In the central southern range, the granitic rocks which form the highest summits, are uncovered by any other formations; but in the northern range (at least that part of it which divides the canton of Berne from the Vallais), the granitic rocks are most frequently covered by calcareous strata, and granite and rocks called primitive are seldom seen, except in the valleys and gorges by which this chain is intersected. One traveller boasts of having reached the summit of the Jungfrau, and discovered upon it hornblende with mica and clay slate; but I found that the accuracy of this statement was much doubted at Berne. I was several days at the foot of the Jungfrau, and I frequently examined its summit with a telescope, on the side where the escarpement is almost perpendicular and uncovered with snow, and it appeared formed of strata that were nearly

horizontal, and which are most probably limestone.

I have already noticed the thermal waters of the Alps (Vol. I. 344 to 353), but I cannot avoid repeating what appears to me most extraordinary, that notwithstanding the numerous hot springs which are gushing out at the feet of the central Alps, and on both sides of the southern range, along a very extended line, yet these springs have hitherto been regarded by geologists as insulated phenomena, unconnected with each other, or with the geology of the Alps. They appear to me to afford no obscure indications of the cause which has broken the surface of the earth, and raised the colossal masses of the Alps so many thousand feet above the general level of the country. In the Grecian and Pennine Alps, it is true, that few rocks occur similar to modern lava, but the proofs of subterranean heat which the thermal waters afford, are abundant. I have no knowledge of the thermal waters in the Rhetian Alps, but rocks of an undoubted volcanic character occur there, particularly in the valley of Fass. On the northern side of the Swiss Alps, if no thermal waters are discovered, it may, I

conceive, be satisfactorily accounted for by the immense alluvial deposition of sandstone and coarse conglomerate, that covers the declivities of these mountains to an amazing depth, and extends to the feet of Jura range.

It may perhaps be supposed, that in the comparisons which I have occasionally made between the geology of England and that of the Alps, I have omitted to notice the calcareous formation, denominated in England the mountain-limestone, which occurs so abundantly in Derbyshire, and the western parts of Yorkshire, Northumberland, and Durham, and also in Monmouthshire, and some of the western counties. When geology first began to excite much attention in this country, the access to the Continent being difficult, English geologists were content to class the secondary rocks after characters furnished by Werner or his disciples: these characters were very imperfect, as the classification of strata from fossil remains was then scarcely understood. Hence the mountain limestone was for some time called flœtz-

limestone, merely because it is often regularly stratified, and the strata are frequently but little inclined; and these accidental characters were considered as of more importance than its essential characters, which are all those of transition limestone. This error having once been adopted, has been strenuously maintained to the present time, and the appellation of transition limestone has been confined to a few calcareous beds in Shropshire and elsewhere, that are, in reality, only a lower part of the series of mountain limestone, separated by what is called the old red sandstone, which latter is a variety of what the French call psammite, or arenaceous greywacke. Of this I had long been convinced; but on my second visit to Paris, I took with me specimens of all our principal mountain limestones, and also of the limestone of Shropshire. The former, particularly the encrinal bed of Derbyshire and Durham, and the black limestone, with madrepore, were considered by both Professors Brochant and Brogniart, to be the true types of transition limestone, or what they called *calcaire de transition par excellence.* I mention this, because it is particularly to be desired, that the geologists of different

countries should be agreed in the use of leading names.

A distinguished English geologist has lately applied the term *carboniferous limestone* to the upper transition, or mountain limestone, a term which I must think singularly inappropriate, as it is well known that in or under this limestone, no *good* coal is ever found in England or Wales; indeed the occurrence of any coal in or under it, is unknown in most of the situations in which it occurs; whereas the term *metalliferous limestone,* I had before applied to it, was so far appropriate, as ninety-nine out of every hundred tons of lead produced in Great Britain, are obtained from this limestone, and from no other. On my return from the Continent I passed some time in Monmouthshire, and fully ascertained that the transition limestone is only a lower part of the mountain limestone series, and that the old red sandstone, as it is called, contains subordinate beds of true greywacke schist; but what may be thought remarkable, it also passes in some parts into clay-stone, exactly similar to that of Braid Hill, near Edinburgh. On this subject it would be out of place to enlarge

here; it is my intention to advert to it more fully in a third edition of my Introduction to Geology, which I propose to publish, if my health permit, with such additions and alterations, as the present improved state of the science requires. The second edition has long been out of print in England, but it has been translated into German by M. Muller, and published at Freyberg.

NOTES

TO

THE SECOND VOLUME.

CHAP. V. p. 127.

Witchcraft.

It ought to be mentioned, that after the execution or murder of so many people for sorcery, Geneva had the honour of being the first protestant state in Europe, which declared publicly its disbelief in witchcraft; the last person who was executed there for this supposed crime was in the year 1652, which was nearly half a century before we renounced the practice of hanging witches in England. The belief in withcraft is still prevalent in Cornwall. The Genevese appear to have lost the art of discovering witches, before they discontinued the practice of burning them, for in the last trials, they were obliged to bring some men from Nyon to discover whether certain spots on the body were the true marks of the devil. In the year 1681, all Switzerland celebrated a solemn fast on the appearance of the comet, which was considered a sign of divine anger; some of the pastors at Geneva objected at first, but conformed to preserve unanimity.

Genevese Clergy.

The following note was omitted by mistake, at p. 139, where it was intended to have been inserted.

With respect to the weekly change of the pastors, it may be a regulation useful to preserve equality among the ministers of a church, not episcopalian; for a pastor who was appointed to preach constantly in the cathedral, might soon imagine himself the possessor of the seat of the former Bishops of Geneva. Were the change, however, less frequent or every quarter of the year, all fear of spiritual domination might be removed, and the inconveniences of the present system diminished. Such a dread of individual ascendency exists, among the Genevese clergy, that the president or moderator in their assemblies is changed once a week, and when some repairs were made in the room where they assemble, the carpenter having raised the chair of the moderator a few inches above the rest, this gave such offence, that he was ordered to take it down, and place it on an exact level with the other seats.

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THE END.

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